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EASTERN ARCHIPELAGO PILOT

VOL. II

COMPRISING THE
SOUTH-EASTERN END OF SUMATRA, SUNDA STRAIT, JAVA, ISLANDS EASTWARD OF JAVA, SOUTHERN AND EASTERN COASTS OF BORNEO, MACASSAR STRAIT, CELEBES, AND THE WESTERN PART OF THE SOELA EILANDEN

SIXTH EDITION
1949

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Eastern Archipelago Pilot

VOLUME II

COMPRISING THE

SOUTH-EASTERN END OF SUMATRA, SUNDA STRAIT, JAVA, ISLANDS EASTWARD OF JAVA, SOUTHERN AND EASTERN COASTS OF BORNEO, MACASSAR STRAIT, CELEBES, AND THE WESTERN PART OF THE SOELA EILANDEN

SIXTH EDITION, 1949

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This, the sixth edition, has been prepared by Captain F. M. Hodgson, R.N., and contains the latest information received in the Hydrographic Department.

The meteorological information has been revised by the Meteorological Office of the Air Ministry. Temperature is expressed in degrees Fahrenheit, rainfall in inches, speed in knots, and distance in nautical miles unless expressly stated otherwise. Information received from meteorological services which do not use these units has been converted into the units mentioned above by the Meteorological Office.

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By the publication of this volume, the fifth edition of Eastern Archipelago Pilot, Vol. II, 1934, and Supplement No. 8, 1947, are cancelled, and all information affecting that work contained in Notices to Mariners up to and including No. 1099 of 1949, has been embodied in this volume; for Temporary and Preliminary Notices to Mariners affecting this edition, the list of Temporary and Preliminary Notices to Mariners in force, published monthly in the weekly edition of the Admiralty Notices to Mariners, should be consulted.

A. G. N. WYATT,
Vice-Admiral and
Hydrographer of the Navy.

Hydrographic Department,
Admiralty, London,
27th May, 1949.

BIBLIOGRAPHY

The following publications have been consulted in the preparation of the present edition :—

Zeemansgids voor de Oost-Indische Archipel, Deel. I, 1949, has been used for Sunda strait, Tandjoeng Priok haven and approaches, and the south-western extremity of Borneo.
Zeemansgids voor Nederlandsch Oost-Indië, Deel. II, 1947, with Supplement No. 2, 1949, thereto, has been used for Java and the western part of Kleine Soenda eilanden, including the western half of Flores ; also for the south and east coasts of Borneo, Macassar strait, Celebes and adjacent islands.
Zeemansgids voor Nederlandsch Oost-Indië, Deel. III, 1933, with Supplement No. 3, 1948, thereto, has been used for the eastern part of Kleine Soenda eilanden, including Timor and Wètar, and the western part of Soela eilanden.
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GLOSSARIES

OF WORDS OCCASIONALLY FOUND IN THE CHARTS AND SAILING DIRECTIONS.

JAVA-MALAY.

Java-Malay.	English.	Java-Malay.	English.
Antassan	Passage, cutting.	Lumpur	Mud.
Ayer	Water.	Mota	River.
Baharu	New.	Muara	Mouth of a river.
Batu	Rock, stone.	Nanga, Nangah	River.
Besar	Large, great.	Napo or Napo napo (on north coast of Celebes).	Reef.
Beting	Shoal, sand.		
Bukit	Mountain, hill.		
Chetek	Shallow.	Ngaru	Point.
Chi	River.	Nipa	Small marsh palm.
Dalam	Deep.	Nisa, Nusa	Island.
Darat	Coast, land.	Noil	River.
Doro	Mountain.	Panjang	Long.
Gili	Island, rock.	Pasi, Pasie (Celebes)	Reef.
Gunong	Mountain.	Pasir, Passi	Sand, shoal.
Ili	Mountain, hill.	Pelabuan	Anchorage.
Itam	Black.	Pingir laut	Coast, seaboard.
Jalan	Road.	Pocho (Flores)	Mountain.
Kaler	North.	Puhun	Tree.
Kali	River.	Pulau	Island.
Kampong	Village.	Putih	White.
Karang	Coral reef.	Renda	Low.
Kechil	Little, small.	Selat	Channel, strait.
Kering	Dry.	Sungei	River.
Kota	Town, village.	Taka, Takat	Shoal, reef, rock.
Kuala	River mouth.	Tanjong	Cape, point.
Kulon	West.	Telok	Bay.
Labuan	Anchorage, bay.	Toro	Cape, point.
Lama	Old.	Trusan	Passage, channel.
Laut	Sea.	Tukoh	Islet, rock.
Lehok	Bay, inlet.	Tuwak	Old.
Loku	Inlet, creek or river.	Waë, Wai	River, creek.
		Wutun	Point.

BUGIS.

Bugis.	English.	Bugis.	English.
Baichu	Little, small.	Manne	Shallow.
Balango	Anchor.	Maputih	White.
Baru	New.	Marakho	Dry.
Batowa	Large, great.	Mariawa	Low.
Batu	Rock, stone.	Matoa	Old.
Becho	Little, small.	Menralang	Deep.
Bola	House.	Paduran	Town.
Bulu	Mountain.	Pong-ajie	Tree.
Enne	Shallow.	Potana	Coast, land.
Gosong	Sand, shoal.	Prau-Lopi	Ship.
Jiko	Bay.	Salla	Strait.
Kaluku	Coconut.	Salo	River.
Karang	Coral reef.	Solok	Strait.
Kassi	Sand.	Tanah	Land.
Labuwang	Anchorage.	Tasi	Sea.
Layland	Road.	Timuna-salo or Timuna-winanga	Mouth of a river.
Lemba	Bay.	Tulu	Cable.
Libukang	Island.	Ujong	Cape, point.
Lopo, or Lopo Bungka	Mud.	Uwae	Water.
Mabiring-tasi	Coast, seaboard.	Wanuwa	Town.
Malampe	Long.	Winanga	River.
Malotong	Black.		

NOTE.—The Bugis words were supplied by the Secretary for Native Affairs at Makasser.

DUTCH.

Dutch.	English.	Dutch.	English.
Archipel	Archipelago.	Noord	North.
Baai	Bay.	Oost	East.
Bank	Bank, shoal.	Oud	Old.
Berg	Mountain.	Punt	Point.
Boom	Tree.	Reede	Roadstead.
Bocht	Bight.	Rif	Reef.
Droogte	Shoal.	Rivier	River.
Eiland	Island.	Rood	Red.
Eilandje	Islet.	Rots	Rock.
Gebergte	Mountain range.	Schiereiland	Peninsula.
Geul	Channel.	Steen	Small rock, stone.
Golf	Gulf.	Straat	Strait.
Groot, groote	Great, large.	Vaarwater	Channel, navigable water or fairway, passage.
Heuvel	Hill.		
Hoek	Cape, point.		
Hoofd	Headland.	Valsch	False.
Hoog	High.	Vlakte	Plain.
Kaap	Cape.	Vulkaan	Volcano.
Klein, kleine	Little, small.	West	West.
Kloof	Cleft.	Wit	White.
Kreek	Creek.	Zand	Sand.
Meer	Lake.	Zuid	South.
Midden	Middle.	Zwart	Black.
Nieuw	New.		

SYSTEM OF ORTHOGRAPHY.

The following rules for the spelling of geographical names (termed the R.G.S. II system) have been adopted for British official use, and the names in Admiralty Hydrographic publications will be rendered in accordance with these rules as opportunity occurs.

In new editions of the various volumes of sailing directions names are, generally speaking, given in accordance with these rules, but where the name on the chart shows an older rendering of a name, such chart name is given in brackets after the new rendering and will also be given in the Index.

The rules for spelling in the R.G.S. II system are as follows:—

(1) The spelling of every place-name in an independent country or self-governing dominion using the Roman alphabet (including " Roman " alphabets containing extra or modified letters, such as Czech, Serb-Croat, Polish, Romanian, &c.) shall be that adopted by the country or dominion.

(2) In colonial possessions the spelling of such place-names as belong to languages coming under Rule (1) will be spelt in accordance with that rule.

(3) The accents and diacritical marks in official use by the above countries will be retained. Wherever it appears desirable, the pronunciation will be shown by giving the name as transliterated on the system below.

(4) All other place-names throughout the world will be spelled in general accordance with the following system.

The broad features of this system are—

- (*a*) That vowels are pronounced as in Italian and consonants as in English:
- (*b*) That every letter is pronounced, and no redundant letters are used.

This system aims at giving a close approximation to the *local* pronunciation; but it is recognised that in some languages, notably Russian, Greek, and Arabic, the necessity for letter-for-letter transliteration often renders this impossible.

Table of Spelling and Pronunciation R.G.S. II.

a	The long and short Italian vowels, as in *lāvă* ..	Somāli; Răvennă.*
ä	Between *a* in *fat* and *e* in *eh*?; chiefly in Teutonic and Finno-Ugrian languages	Mähring; Pärnu.
ai	The two Italian vowels, frequently diphthongal, almost as in *aisle*; but pronounced *ei* and *ĕ* in Greek names	Wadai; Shanghai.
au	The two Italian vowels; frequently diphthongal; almost as *ou* in *out*	Sakau; Bauchi.
aw	When followed by a consonant, or when terminal, as in *awl*, *law*	Dawna; Saginaw.
b	As in English.	
c	Not to be used, but always replaced by *k* or *s*; except in the compound *ch*, and in many conventionally-spelt words, as	Kandahar; Serang. Calcutta; Celébes.
ch	As in *church*; never *tch* or *tsch* for this sound ..	Chad; Kerch.
d‡	As in English.	
dh	Soft *th* as in *they*; a slight *d* sound sometimes preceding it in Semitic languages	Hadhramaut; Riyadh.
e	Long as in *eh*? short as in *bet*. (For the *e* sound in the French *je*, see note at end on the "neutral vowel.")	Gēlo; Mafĕking.*
(ee)	Used for *i* (*q.v.*) only in a few conventional names	Darjeeling; Keelung.
ei	The two Italian vowels, frequently diphthongal as in *rein*, but pronounced *i* in Greek names ..	Beirut; Raheita.
(eu)	Not used as a single sound.	
f	As in English; *ph* must not be used for this sound	Mustafa; Maidan-i-Naftun.
g	Hard, as in *get*, *gift*: never as in *gem*, *gin* ..	Gedáref; Gilgit.
gh	Soft guttural, the Arabic *ghain*	Ghadames; Baghdad.
h	Used only when sounded; or in the compounds *ch*, *dh*, *gh*, *kh*, *sh*, *th*, *zh*	Ahmadabad; 'Abdullah.
i	Long as in *marine*; short as in *piano*	Fiji; Kibonde.
j	As in English; except in transcription of Chinese, where it equals *zh*, or the French *j*	Juba, Ujiji (Eng. *j*); but Jaoping (Fr. *j*).
k	As in English; hard *c* should never be used (except in conventionally-spelt words)—thus, not Corea, Cabul, but	Korea; Kabul.
kh	Hard aspirated guttural, as in the Scottish *loch* (not as in *lock*)	Khan; Sebkha.
l‡ **m** **n**‡	As in English.	

*The long and short symbols given here are merely for explanation, not for use.

‡See note at end on *Liquid sounds.*

ng	Has three separate sounds, as in *vanguard, finger,* and *singer.* If necessary to distinguish, a hyphen may be placed, as in *van-guard, singer-*	In-galla; Bongo; Ng-ami; Tong-a.
ngg	May be used for the sound of *ng* as in *finger*	Trengganu; Yanggang-a.
o	Long as in *both*¶: short as in *rotund*	Kigōma; Hŏnŏlulu.*
ö	As in German; equals the French *eu* in *peu*; or nearly the English sound in *fur*	Barköl.
(oo)	Used for *u* (*q.v.*) only in a few conventional names, chiefly Indian and Chinese	Poona; Foochow.
oi	The two Italian vowels; frequently diphthongal as in *oil,* but pronounced like *i* in *fit* in Greek names	Hanoi.
öi	The diphthong as in French *oeil* and Norwegian *höi*	Höiland.
ou	Dissyllabic, and not as French or English *ou,* except in Greek names where it has the French value	Zlatoust; Yaroua.
ow	Used as a diphthongal combination of *ō* and *w* only in the romanisation of Chinese	Hankow.
p	As in English.	
ph	As in *loophole*; not to be used for the *f*-sound, except conventionally	Chemulpho; Haiphong.
q	Represents *only* the Arabic *qaf* and the Hebrew *qof*; i.e. a guttural *k* (as a rule)	Qena; Qiryath.
qu	Should never be employed to represent the sound of *kw*; thus, not Namaqua, Quorra, but	Namakwa; Kworra.
r	As in English; should be distinctly pronounced.	
s‡	As English *ss* in *boss,* not as in *these* or *pleasure*	Burgos; Masikesi.
sch	As in *discharge*	Peschanka.
sh **t**‡	As in English.	
th	Hard *th* as in *thick,* not as in *this* (except conventionally in Fijian)	'Athlith; Thingvellir.
u	Long as in *rude,* or as *oo* in *boot*; short as in *pull*	Zūlū; Rŭanda.*
ü	As in German: equals the French *u,* as in *tu* (Fr.)	Üsküdar.
v **w** **x**	As in English.	
y	Always a consonant, as in *yard*; it should not be used as a terminal vowel, *e* or *i* being substituted; e.g. not Kwalý or Wady, but	Kikuyu; Maya. Kwale; Wadi.
z	As in *gaze,* not as in *azure.*	
zh	As the *s* in *treasure,* the *z* in *azure,* or the French *j* in *je*; but for the sound in Chinese use *j* (*vide* note about under *j*)	Zhob.

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*The long and short symbols given here are merely for explanation, not for use.

‡See note at end on *Liquid sounds.*

¶The true Italian ŏ is broader than this; almost as in *broth* (=R.G.S. II *aw*). The letter *o* is conventionally used for this sound in certain names in Nigeria, Tonga, &c.: e.g. Oyo, Fofoa.

Notes.

The doubling of a vowel or a consonant is only necessary when there is a distinct repetition of the single sound, and should otherwise be avoided	Nuusafee; Moorea; Jidda; Muhammad.
Accents should not generally be employed; but in order to indicate or emphasise the stress, an acute accent may be used	Saráwak; Qántara; Tong-atábu; Paraná,
A long or short mark over a vowel (e.g. ā, ŏ) should only be used (and that sparingly) when without it there would be danger of mispronunciation ..	Kūt; Kyōto; Abŏso.
Hyphens will not be used except to indicate pronunciation and with the particle *-i-* (in Persian, Fijian, &c.)	Ta-if; Pusht-i-Kuh; Nuku-i-Ra.

Inverted comma and apostrophe.—The inverted comma ʻ is employed only to represent the Arabic *ʻain*, the Maltese *ʻghain*, and the Hebrew *ʻayin*. The apostrophe ʼ in foreign words indicates a liquid sound (*see* below).

Liquid sounds.—The occasional "liquid" or "palatalised" sound of *d*, *l*, *n* *s*, *t*, &c. (as in *d'you*, *lure*, *new*, *pursue*, *tune*, &c.) is as a rule sufficiently represented by a following *y*; where, however, owing to a following consonant, or to the palatalised letter coming at the end of a word, the *y* is inapplicable, the liquid sound will be represented by an apostrophe, thus: *d'*, *l'*, *n'*, *s'*, *t'*, &c.

The "Neutral vowel."—The "indeterminate" or "neutral" vowel sound (*er*), i.e. the sound of *a* in *marine*, *e* in *often*, *i* in *stir*, *io* in *nation*, *o* in *connect*, *ou* in *curious*, *u* in *difficult*, &c., *e* in French *je*, or the often unwritten vowel (*Fat-ha*) in Arabic, &c., is represented as a rule by *a*: as in Basra, Hawiya; but sometimes by *e*, when the sound approximates more to *e* than to *a*; as Meshed, El Gezira.

(In any guide to pronunciation issued by the Permanent Committee on Geographical Names, the "neutral vowel" is represented generally by the italic *e*: occasionally also by italic *a* or *u*.)

This sound must not be confused with *e-mute*, where the *e* is not sounded at all: as in Abbeville.

Nasal vowels.—In illustrating the pronunciation of French, Portuguese, Polish, &c., nasal vowels, the nasalisation will be represented by italic *n*; as Częstochowa pr. Chā*n*stokhóva.

Note.—The Royal Geographical Society has published a book entitled "Alphabets of Foreign Languages transcribed into English according to the R.G.S. II system." This book enables the correct rendering of names to be obtained, also of names in languages which are transliterated letter for letter.

INFORMATION RELATING TO ADMIRALTY CHARTS AND PUBLICATIONS, GENERAL NAVIGATION, AND GENERAL METEOROLOGY.

ON THE CORRECTION OF ADMIRALTY CHARTS.

Guides to Navigation.—In addition to the charts, the navigational publications which are primarily affected by the continual changes and alterations that take place are the Admiralty Sailing Directions, the Admiralty List of Lights, Fog Signals and Visual Time Signals, and the Admiralty List of Radio Signals. The Admiralty Notices to Mariners contain information mainly for the correction of the charts and navigational publications.

CHARTS.

1. **Degree of Reliance.**—It should be clearly understood that the value of a chart depends on the character of the original survey and on the completeness of the reports of subsequent changes. The remarks on " The Use of Charts as Navigational Aids, &c.", which are subjoined should be carefully studied in this connection.

2. **System of Dating and Issue of Corrected Copies.**—Admiralty charts after first publication, are kept corrected by means of new editions, large corrections, and small corrections. Copies of charts issued by the Hydrographic Supplies Establishment, Admiralty Chart Agents or Admiralty Chart Depôts are corrected, except from temporary and preliminary Notices to Mariners, for all navigational information to the date of issue.

New Charts.—The date of publication of a chart is shown outside the bottom margin, in the middle, e.g. :—

Published at the Admiralty 30th May, 1947.

New Editions.—When a chart is revised throughout and modernised in style a new edition is published, the date being shown outside the bottom margin and to the right of the date of publication, e.g. :—

New Edition 2nd Jany., 1947.

All large and small corrections notations are at the same time erased, and all old copies of the charts are cancelled.

Large Corrections.—When a chart is corrected from important information which is too comprehensive to promulgate by Admiralty Notice to Mariners or to insert conveniently by hand on existing copies, but when the chart is not revised throughout, the date on which these corrections are made is shown on the chart outside the bottom margin and to the right of the date of publication, and in the case of a chart already marked with a new edition date, below such date, e.g. :—

Large corrections 10th Feb., 1947.

All small corrections notations are at the same time erased, and all copies of the chart are cancelled.

Small Corrections.—

(*i*) When a chart is corrected from the information promulgated in an Admiralty Notice to Mariners (except temporary and preliminary Notices), the year, if not already shown, and number of the notice are entered in the bottom left-hand corner of the chart, e.g. :—

Small corrections 1947–*903.*

Copies of the chart stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are corrected by hand from such information.

(*ii*) When a chart is corrected from information which is considered of no importance from the standpoint of safe navigation, and which is, therefore, not promulgated in an Admiralty Notice to Mariners, the year, if not already shown, and date of the correction are entered on the chart, in one of two ways, in the bottom left-hand corner below the margin and in sequence with the notations referred to in the preceding paragraph, e.g. :—

Small corrections, 1947—$\boxed{5.20}$—

or Small corrections 1947—(VI.*25*)

These indicate that the chart received minor corrections on the 20th May or 25th June, respectively.

In such cases copies of the chart held by ships and establishments are not usually replaced by new copies, but in exceptional cases, e.g., when new compasses are inserted, new copies of the charts may be supplied. It should, however, be particularly noted that the absence of corrections represented by square or bracket dates from a chart does not invalidate it for navigation.

3. **Correction of Charts in Ships.**—All small but important corrections affecting navigation that can be made to the charts by hand are promulgated in Admiralty Notices to Mariners and, with the exception of corrections from temporary or preliminary Notices, should at once be neatly made in waterproof violet ink on the charts affected, the year (if not already shown) and numbers of the notices being inserted, also in waterproof violet ink, in the bottom left-hand corner of the chart. The recognised abbreviations shown on Admiralty chart No. 5011 (" Signs and abbreviations used on Admiralty Charts ") should be used.

Generally speaking, the amount of information which should be inserted on a chart should be in accordance with that already shown. *On large scale charts,* the abridged descriptions, as shown on chart No. 5011, of all details of all lights, light-buoys and fog signals, and the year dates of obstructions, reported shoals, dredged channels, depth on bars or in shifting channels, and irregularities of lights, should be inserted.

On coastal charts, the abridged descriptions of only the principal lights and fog-signals, i.e., those to assist in approaching or making the land, should be inserted.

Particulars of such lights should be omitted, in the following order, as the scale of the chart decreases, viz. :—

(i) Elevation, (ii) Period, (iii) Number in Group, and (iv) Visibility.

Particulars of fog signals should be inserted in their appropriate positions if space permits, but should otherwise be entered in a tabulated list under the title or some other convenient place on the chart.

Inner harbour light-buoys and beacons should not be inserted on coastal charts, and against other light-buoys only the character of the light should be inserted.

On ocean charts, lights which are visible 15 miles or over should alone be inserted and then only their character and colour.

On all charts, writing should be inserted as much as possible clear of the water, unless the relative objects are on the water and care should be taken not to obliterate any information already on the chart. When cautionary or tidal notes, &c., are inserted, they should be written in a convenient but *conspicuous* place, preferably near the title, where they will not interfere with other details.

Erasures should never be made but the details should, when necessary, be crossed through in waterproof violet ink.

Admiralty Notices to Mariners are occasionally accompanied by reproductions of portions of charts (known as " blocks "), and when correcting charts from such blocks the following points should be borne in mind :—

(i) A block may not only indicate the insertion of new information, *but also the omission of matter previously shown.* The latter would, however, invariably be mentioned in the text of the Notice, and the fact that a block accompanies a Notice should not cause the text of the Notice to be disregarded.

(ii) The limiting lines of a block are determined for convenience of reproduction and need not be adhered to when cutting out for pasting on the chart, provided that the point mentioned in the preceding paragraph is taken into consideration.

(iii) The new information shown on a block can sometimes be inserted on the chart by hand, the reason for issuing a block in such a case being to avoid a long description of the new information in the text of the Notice.

(iv) Owing to distortion the blocks do not always fit the charts exactly, care should therefore be taken when pasting a block on to a chart that the more important navigational corrections fit as closely as possible. This can best be assured by fitting the block while it is dry and making two or three pencil ticks round the edges for use as fitting marks after the paste is applied.

Corrections from Temporary or Preliminary Notices to Mariners should be inserted on the charts *in pencil* and the year and number of the notice should be shown against them, e.g. :—N.M. 625/1947 temp. and also in the bottom left-hand corner of the chart, in pencil, *below* the small corrections notations (*see* above). Temporary corrections should be rubbed out when the notice is received cancelling them, but preliminary corrections should be inked in when the notice is received reporting that the changes have been made.

Charts stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents and the Admiralty Chart Depôts are *not* corrected from Temporary or Preliminary Notices to Mariners, and when charts are received from one of these sources they should be corrected in pencil as necessary from the copies of such Notices already held, or from those supplied with the charts.

Corrections from Radio Navigational Warnings concerning derelicts and drifting obstructions, the temporary extinction of lights, displacement of important aids to navigation, ice reports, &c., should also be noted *in pencil*, as received, on the charts affected. Radio Navigational Warnings of a permanent nature and those relating to derelicts and drifting obstructions dangerous to navigation are re-issued in the form of Admiralty Notices to Mariners, but other warnings are not re-issued in this way, except in special circumstances.

Corrections from information received from authorities other than the Admiralty should be noted, *in pencil*, on the charts affected, but no charted danger is to be expunged without the authority of the Hydrographer of the Navy.

NAVIGATIONAL PUBLICATIONS.

1. Admiralty Sailing Directions, Supplements, &c.—The Admiralty Sailing Directions, consisting of about 73 volumes for the whole world, contain general information useful to the navigator.

An index chart bound near the beginning of each volume shows the area dealt with and the serial numbers and limits of all Admiralty charts for the area which were published *when the volume was printed.*

Each volume is periodically revised throughout, and, in the intervals between the publication of new editions, Admiralty Notices to Mariners and Supplements are published to enable the volume to be corrected. It should, however, be clearly understood that Sailing Directions cannot be correct in all minor details after the date of the latest Supplement.

The above-mentioned corrections are not made in the Sailing Directions stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts.

A new edition of each volume of Sailing Directions is published at intervals of approximately from ten to twelve years. The number of the latest Admiralty Notice to Mariners used in its compilation is given in the "Advertisement" on page iii of each volume, and the numbers of the Notices affecting it between the dates of going to press and issue to ships and establishments are given in the Notice announcing its publication, to enable the new edition to be corrected before being brought into use.

A Supplement to each volume is generally published annually, each succeeding Supplement cancelling the former. When a volume is taken up for revision, however, no further Supplement to that edition is issued, but subsequent Notices to Mariners affecting it are summarised each year and issued as a separate publication, until the new edition of the volume is published.

A tabular form for notation of the existence of Supplements and Summaries of Notices is printed on the front fly-leaf of all Sailing Directions, and these notations are made as necessary in all copies issued by the Hydrographic Supplies Establishment and the Admiralty Chart Depôts.

Supplements and Summaries of Admiralty Notices to Mariners should be retained intact. *Whenever reference is made to the Sailing*

Directions, the Supplement and where applicable, the Summary, must be consulted. The existence of a Supplement or Summary of Admiralty Notices to Mariners is to be entered in the tabular form inside the cover of the Sailing Directions. Matter appearing in the Supplements for the first time is indicated by marginal lines or underlining and deletions from the previous Supplement are indicated by brackets.

Admiralty Notices to Mariners affecting Sailing Directions *are not* to be cut up and pasted in, but the book is to be annotated in the margin, or corrected in manuscript, as convenient.

2. **The Admiralty List of Lights, Fog Signals and Visual Time Signals.**—The Admiralty List of Lights, Fog Signals and Visual Time Signals for the world is issued in twelve volumes divided geographically as shown on the index chart at the beginning of each volume.

Light-buoys are *not* included in the list.

The volumes are published annually at the rate of one volume per month commencing with Volume 1 in January and ending with Volume 12 in December. Supplements to these volumes will not be issued.

Each volume will be issued with an inscription on its cover and title page stating the date to which the volume has been corrected, which will be approximately six weeks prior to the date of its issue. Permanent and temporary corrections or additions to each volume, which may occur between the date of correction and date of issue, will be promulgated by Section III of Admiralty Notices to Mariners.

Amendments.—Important amendments are promulgated in Admiralty Notices to Mariners. In Section IIIA of each Weekly Complete Edition of these Notices will be found all additions and alterations made to Lights, Fog Signals and Visual Time Signals by the Notices issued during the week affected; certain other additions and alterations are also included in Section IIIA, which, though not of sufficient importance to necessitate the issue of a Notice to Mariners, will be found of use to the seaman. Section IIIB contains similar information but of a temporary character.

Corrections to the Light Lists should be made in pencil, or extracted from Section III and pasted in the appropriate volume.

Note.—Corrections are not made in copies of the Lists of Lights, &c., stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts, and copies received from these sources should accordingly be corrected from the weekly editions of the Notices to Mariners before being brought into use.

3. **The Admiralty List of Radio Signals.**—The Admiralty List of Radio Signals is issued in three volumes.

Volume I.—Communications—Comprises particulars of radiotelegraph coast stations, together with general regulations; it also includes such subsidiary services as medical advice supplied by radio, together with details of the organisation for transmitting British official messages to merchant ships.

Volume II.—Navigational Aids—Comprises particulars of services from direction-finding stations, radiobeacons, and radio navigational aids (position fixing systems) together with radio time signals and navigational warnings (with ice signals); all relevant codes and regulations will be found in this volume.

Volume III.—Meteorological Services—Comprises particulars of weather services provided for the use of shipping, together with relevant codes and lists of meteorological observation stations.

New editions of each volume will normally be published annually.

A Supplement to each volume is also issued. These Supplements embody corrections subsequent to the date of going to press and are issued gratis with each volume. All corrections later than those included in the Supplements are promulgated in Section IV of the complete weekly edition of Admiralty Notices to Mariners.

Copies of the List stocked by the Hydrographic Supplies Establishment, Admiralty Chart Agents or the Admiralty Chart Depôts are not kept corrected, and Lists received from these sources should accordingly be corrected from the Supplements and from the weekly editions of the Admiralty Notices to Mariners before being brought into use.

4. **The Admiralty Tide Tables.**—The Admiralty Tide Tables are published in three sections as follows:—

For "HOME WATERS (British Isles, Europe and north coast of Africa)."

For "ATLANTIC AND INDIAN OCEANS."

For "PACIFIC OCEAN AND ADJACENT SEAS."

Each section contains two parts, Part I giving tidal predictions for Standard Ports and tidal stream predictions for certain straits and channels. Part II giving data for predicting tides at places which are not Standard Ports.

Admiralty Tide Tables, Part III, contains instructions for predicting tides and tidal streams, and for analysing observations of tides and tidal streams, with tables to assist prediction and analysis.

THE USE OF CHARTS AS NAVIGATIONAL AIDS AND GENERAL REMARKS RELATING TO PRACTICAL NAVIGATION.

(1) **Reliance on a chart.**—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger the scale of the chart.

To estimate this the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of the soundings is another method of estimating the completeness of a chart. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

It appears to be insufficiently realised that the degree of reliance which may reasonably be placed upon an Admiralty chart, even in surveys of modern date, is mainly dependent on the scale on which the survey was made. The scale for publication is now generally that of the original survey, except in the case of coast sheets which are sometimes reduced. It should not, therefore, be assumed that the original survey was made on a larger scale than that published.

It must be borne in mind that the principal method of ascertaining the inequality of the bottom of the sea is by the laborious process of sounding, and that in sounding over any area, the boat or vessel obtaining the soundings is kept on given lines; that each time the lead descends, or a sonic sounding is taken, the depth over only a small area is obtained, in the case of the lead, it has a diameter of only a few inches, and that consequently each line of soundings, though miles in length, is only to be considered as representing a narrow width.

Surveys are not made on uniform scales, but each survey is made on a scale commensurate with its apparent importance. For instance, a general survey of a coast, which vessels only pass in proceeding from one place to another is not usually made on a scale larger than one inch to the nautical mile, while surveys of areas where vessels are likely to anchor, are made on a scale of three inches to the mile, and surveys of frequented ports or harbours likely to be used by fleets, on a scale of from six inches to ten inches to the nautical mile.

Close examination by sounding is the only method by which surveys on a large scale can be made, and in view of the vast mileage of surveys yet requiring completion in the interests of navigation, it would be a waste of time to undertake large scale coast surveys.

The scale on which a survey is to be conducted having been settled, it is manifestly superfluous to obtain more lines of soundings than can be represented on the paper. 100 soundings, which is the maximum number that can be placed with clearness on every square inch of paper, means that on a scale of one inch to the mile each sounding on the chart occupies an area representing eight acres of actual ground, whilst on a scale of six inches to the mile each sounding represents an area of a little less than a quarter of an acre, i.e., of 100 feet square.

The following diagram represents as many soundings as can be placed legibly on a square inch of paper:—

16	15	15	13	13	14	12	11	10	9
14	15	14	14	13	13	12	11	9	8
15	15	14	17	16	14	13	10	10	9
16	16	17	18	16	12	11	8_3	9	10
18	17	15	12	9	7_3	7_4	7_4	9	10
19	16	12	9	5_3	4_4	5_4	6_4	8_3	9
22	19	16	10	3_4	5_1	6_1	7_3	8_3	10
20	16	12	7_1	5_4	6_1	6_4	7_1	8_3	10
18	15	11	9	7_3	7	7_3	8_3	10	11
20	17	14	11	12	10	9	10	11	13

Little assistance in detecting excrescences on the bottom is afforded by the eye, when sounding in a boat, even in clear water, on account of the observer being within five feet of the surface; none in turbid seas. If, therefore, there is no inequality in the soundings to cause suspicion, a shoal patch between two lines may escape detection.

Thus, in a chart on a scale of one inch to the mile, an inequality of some acres in extent rising close to the surface, if it happened to be situated between two lines, might escape detection; whilst in a chart on a scale of 6 inches, inequalities as large as battleships, if lying parallel with, and between the lines of soundings, might exist without detection if they rose abruptly from an otherwise even bottom.

General coast charts should not, therefore, be looked upon as infallible, and a rocky shore should on no account be approached within the ten-fathom contour line, without taking every precaution to avoid a possible danger; and even with surveys of harbours on a scale of 6 inches to the mile vessels should avoid, if possible, passing over charted inequalities in the ground, as some isolated rocks are so sharp that the lead may not find the highest part. Better results can, however, be obtained by sonic sounding owing to the rapidity with which such soundings can be taken, but even this method will not find rocks unless the boat or vessel be directly over them.

Blank spaces among soundings mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that in the blanks the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion.

Soundings in hair line, which are shown on the latest charts in upright figures, and on other charts in sloping figures, indicate that such soundings have been taken from smaller scale charts, an unreliable source, or adapted from old and imperfect surveys.

(2) **Fathom lines a caution.**—Except in plans of harbours that have been surveyed in detail, the six-fathom line on most Admiralty charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shore in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, as before mentioned, another warning, especially for ships of deep draught.

Charts on which no fathom lines are marked must be especially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided as there is no knowing how closely the spot may have been examined.

(3) **Chart on largest scale always to be used.**—It sometimes happens that from press of work, only the copper plate of the larger scale chart of a particular locality can at once receive any extensive re-arrangement of coastline or sounding. This is an additional reason, besides the obvious one of the greater detail shown, why this largest scale chart should always be used for navigating.

(4) **Caution in using small-scale charts.**—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on a small scale the same amount of displacement means large fractions of a mile.

For the same reason bearings to near objects should be used in preference to objects farther off, although the latter may be more prominent, as a small error in bearing or in laying it down on the chart has a greater effect in misplacing the position the longer the line to be drawn.

(5) **Graduation.**—All plans are now being graduated in skeleton style before publication in order to facilitate easy reference to astronomical positions; previously published plans are also graduated as

opportunity offers. The graduation is, however, of necessity often based upon imperfect information of a conflicting nature; for this reason, whenever an astronomical position is quoted other than approximate (i.e., when seconds are given), it is necessary to quote also the number of the particular chart from which the position has been derived.

In this connection it is pointed out that, whenever possible, a position should be transferred from one chart to another by bearing and distance from a distinguishing feature common to both, such as a point of land or a light, &c., and not by the graduation which may differ owing to one of the charts being constructed on later and more complete astronomical data than the other.

(6) **Distortion of printed charts.**—The paper on which charts are printed is, from various causes, subject to distortion, but the effect of this is seldom sufficient to affect navigation. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted upon the chart, especially if the lines are to objects at some distance. The larger the chart the greater the amount of this distortion.

(7) **Buoys.**—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact position. Buoys should, therefore, be regarded as warnings and not as infallible navigating marks, especially when in exposed positions; and a ship should always, when possible, be navigated by bearings of fixed objects on shore or angles between them, and not by buoys.

(8) **Light-buoys.**—The lights shown by light-buoys cannot be implicitly relied on, as, if *occulting* or *flashing*, the apparatus may get out of order, or the light may be altogether extinguished. These lights in the British isles are from 5 to 217 candle-power.

(9) **Cable-buoys.**—Cable-buoys marking the ends of submarine cables usually are spherical or can shaped, surmounted by a globe and occasionally a flag. Below the topmark two *white fixed* lights, disposed horizontally, may be exhibited, but they cannot be implicitly relied on.

(10) **Lights.**—Arcs drawn on charts round a light are not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show the same characteristics or colours in all directions, the bearings between which the differences occur.

All the distances given in the Admiralty List of Lights and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to elevation, at the beginning of each volume of the Admiralty List of Lights, affords a means of ascertaining how much more or less the light is visible should the height of the eye be more or less. The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be afterwards obtained from the compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by remarking its candle-power, as given in the Admiralty List of Lights, and in some cases by noting how much its visibility in clear weather falls short of the range due to the elevation at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles in clear weather, is manifestly of little brilliancy, as its elevation would permit it to be seen over 20 miles, if of any power. (*See* table in the Admiralty List of Lights.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip it may be determined whether the vessel is in the circle of visibility corresponding with the usual height of the eye or unexpectedly nearer the light.

(11) Fog signals.—Sound is conveyed in a very capricious way through the atmosphere. The following points in regard to fog signals should be borne in mind:—

(*a*) Fog signals are heard at greatly varying distances.

(*b*) Under certain conditions of atmosphere, when an air fog signal is a combination of high and low tones one of the notes may be inaudible.

(*c*) There are occasionally areas around a fog signal in which it is wholly inaudible.

(*d*) A fog may exist a short distance from a station and not be observable from it, so that the signal may not be sounded.

(*e*) Some fog signals cannot be started at a moment's notice after signs of fog have been observed.

Mariners are therefore warned that fog signals cannot be implicitly relied upon, and that *the practice of sounding should never be neglected.* Particular attention should be given to placing "Look-out men" in positions in which the noises in the ship are least likely to interfere with the hearing of the sound of an air fog signal; as experience shows that, though such a signal may not be heard from the deck or bridge when the engines are moving, it may be heard when the ship is stopped, or from a quiet position. It may sometimes be heard from aloft though not on deck.

Great assistance may be obtained from radio beacons at many important lighthouses and light-vessels, but the attention of Mariners is called to the serious dangers which may arise from their misuse. No attempt should be made to approach such a position on a radio bearing, whilst relying only on hearing the sound fog signal in sufficient time to alter course to avoid danger. When the radio fog signal is transmitted from a light-vessel, it is essential in order to avoid collision, that the bearing from the light-vessel should not be kept constant.

(12) Tides.—In navigating coastal waters where the range of the tide is considerable, caution is always necessary. The tidal predictions for Standard ports in the Admiralty Tide Tables can generally be relied upon to give the times of high and low water to within a few minutes, and heights within a few tenths of a foot. Larger errors are to be expected in the predictions for places which are not Standard ports, computed from the data in Part II, but such predictions computed from the harmonic constants are always sufficiently accurate for the general requirements of navigation. For Standard ports the heights of the tide at times between high and low water may usually be found within narrow limits in accordance with the instructions in Parts I and III of the Tide Tables.

The datums of Admiralty charts depending on Admiralty surveys vary with the type of tide, but usually conform with the International agreement, that datum should be " a plane so low that the tide will but seldom fall below it." The datums used by different nations, however, differ very considerably and those of Admiralty charts depending on foreign surveys are always those used by the original surveyors, which vary from " lowest possible low water " to " mean low water " in tidal waters, and are usually mean sea level in non-tidal waters.

The datum used is always stated on large-scale Admiralty charts.

Caution.—Most datums are above the lowest level to which the tide may fall; the charts therefore do not always show minimum depths.

(13) **Tidal streams.**—Where the tidal streams are semi-diurnal information regarding them is usually given, in a convenient part of the chart, in tabular form or by notes, special symbols being inserted at the positions to which the information refers. In certain cases, where the information available is incomplete, the streams are indicated by means of arrows.

There are many places where the tidal streams cannot be predicted by reference to the tide at a Standard port. Although no data for predicting the times at which they flow is given, their general direction is, in many cases, indicated by arrows on the charts. For a few of the straits and channels, where these conditions exist, tidal stream predictions are given in Admiralty Tide Tables.

Tidal streams, particularly if rotary, may vary considerably both in direction and rate; predictions of the stream must therefore always be considered approximate.

The turn of the tidal stream is not usually coincident with the times of high and low water; in fact, though in estuaries, harbour entrances, &c., the stream usually turns at about the times of high and low water, in open channels, and along open coasts generally, the turn usually occurs more nearly at half tide. Predictions of the times of high and low water must therefore never be used as predictions of the times of slack water.

It should be remembered that, even where the general direction of the stream is parallel with the shore, an indraught is usually experienced when crossing the entrances to bays and inlets.

(14) **Fixing positions.**—For further information on this subject, *see* Admiralty Manual of Navigation.

When in sight of land, every opportunity should be taken of fixing the ship's position by terrestrial objects.

(*a*) *Simultaneous bearings or angles*.—The most usual method is by compass bearings of suitable objects, and it must be borne in mind that a fix by only two bearings is liable to error, either an absolute error in taking the bearings, or those made in applying the deviation or in laying the bearings off on the chart. For these reasons, a third or check bearing of some other object should, when possible, be taken, especially when near the shore or dangers. The coincidence of the resulting three lines will prevent any mistakes if the objects are suitably placed.

The position may also be fixed by observing horizontal sextant angles of well-defined suitably placed objects. These angles may be plotted on the chart with a station-pointer. Two conditions are, however, necessary to its successful employment; first, that the objects be well chosen; and, second, that the observer is skilful and rapid in his use of the sextant and station-pointer. For the former, reference can be made to the pamphlet on the use of the station-pointer, or to the Admiralty Manual of Navigation; the latter is only to be obtained by practice.

It will readily be seen that a sextant often offers advantages, as angles can be obtained from any position whence the objects are visible, and the fix is in no way dependent on the compass.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by its means. A small error in either taking or plotting a bearing under such circumstances may put the ship ashore.

In all cases where great accuracy of position is required such as the fixing of a rock or shoal, or the addition to a chart of fresh soundings or new buildings, angles should invariably be used. In such cases angles should be taken of a number of objects, five being a good number, since this not only fixes the position beyond doubt, but also affords a useful check on the accuracy of the chart itself. When running a line of soundings it is only necessary to take a third angle every now and then, firstly to make certain that the more important soundings, as at the end of a line, are correctly placed, and secondly to check the general accuracy of the chart.

Sometimes when only one of the selected objects is visible from the compass, a compass bearing of it and a sextant angle to the other may be used to fix the position.

(*b*) *Simultaneous bearing and distance.*—Attention is also directed to the very useful and handy method of fixing by the bearing and distance of a suitable object.

Should the ship be supplied with ranging equipment, its use here is obvious, but without it a very good approximate distance of an object of known height may be obtained by observing its angle of elevation and obtaining its distance from Lecky's Offshore Distance Tables, which are supplied with all sets of charts. Full directions for the use of these Tables are given with them.

(*c*) *The running fix.*—If two position lines are obtained at different times the position of the ship may be found by transferring the first position line up to the time of taking the bearing for the second position line. The point of intersection of the second and the transferred position line is the ship's position at the time of the second observation.

The accuracy of this fix will depend on the accuracy of the estimated run (over the ground) between bearings and, therefore, it is essential to take great care that an accurate allowance is made for tidal stream, current, and leeway experienced by the ship during this interval.

The method of fixing by doubling the angle on the bow is useful when passing points of land, &c., in waters where there is either no tidal stream or current, or where this can be estimated with sufficient accuracy.

This method is as follows:—

Suppose that the angle between the ship's head and an object is measured, and found to be X°, and that the time of the observation is noted. Suppose also that the time is again taken when the angle between the ship's head and the object is 2X°. Then, if the course made good is the course steered, the distance of the ship from the object at the time the second bearing was taken is equal to the run (over the ground) in the interval. Hence the ship's position can at once be laid off as a bearing and distance from the object. In practice the angle X should not be less than about 25°.

The most useful form of this method, the so-called "four-point" bearing, gives a good fix for a departure, but does not ensure safety, as the point and any dangers that may lie off it are abeam before the position is obtained.

The above fix is reliable when there is no tidal stream or current or when it runs directly with or against the course of the ship. When the stream or current runs across the course of the ship or when leeway is to be allowed for, this method should never be used and the ship's position should be obtained by plotting the two bearings as a running fix.

A table "Distance of an object by two bearings" is supplied with certain chart folios, and is also given in Inman's Tables, by which the ship's position at the second bearing can be found: any two bearings at a suitable angle to each other may be used, together with the run between them, but, again, this table should not be used when the vessel is subject to a cross tidal stream or leeway.

(*d*) *The danger angle.*—The use of the danger angle in passing outlying dangers with land behind them should also not be forgotten.

A vertical danger angle is useful when the danger lies off an object such as a lighthouse, the height of which is known; the angle being obtained from the aforesaid Lecky's Tables. If a horizontal danger angle between two objects is used, however, caution is necessary, as, should the objects not be correctly placed on the chart, the angle taken from it may not serve the purpose. This method should not, therefore, be employed when the survey is old or manifestly imperfect.

(*e*) *The astronomical position line.*—When fixing by astronomical observations, attention is drawn to the great utility of the position line. Even a single position line may at times give invaluable information, as the ship must be somewhere on this line, provided that the chronometer error is accurately known.

A sounding obtained at the same time may often serve to give an approximate position. Again, by steering along, or at a required distance parallel to, a single position line, a vessel may make her port or avoid a danger, although uncertain of her position.

A very accurate position may be obtained by observations of three or more stars at evening or morning twilight, or by the observation of a bright star at daybreak and another shortly afterwards of the sun when a few degrees (not less than 10°) above the horizon. The position lines obtained from the bodies observed should differ in azimuth by 30° or more.

Mariners are also reminded that, with modern tables for correcting the altitude, observations of the moon entail practically no more calculation than those of a planet. Moon sights are sometimes available when stars are obscured by light cloud, &c.; also, an excellent position may frequently be obtained by simultaneous observations of the sun and moon.

(*f*) *The radio position line.*—A number of radio systems of which the principal ones are M/F D/F, Radio Beacons, Consol Beacons, Loran, Gee and Decca, are now in general use from which position lines or fixes may be obtained.

The accuracy and range which may be obtained from these systems vary considerably; their great advantage over other methods lies in the fact that they can be employed under all weather and visibility conditions, though in some cases the results obtained will vary between day and night.

Special receiving equipment is generally required in order to make use of the radio signal, and some systems require special lattice charts or tables for plotting the position lines. Full details of these systems and their coverage areas are contained in Admiralty List of Radio Signals, Volume II.

The mariner should appreciate that with the position-fixing systems the accuracy of a fix will depend on three factors:—

(i) The distance of the observer from the transmitters.
(ii) The bearing of the observer from the base line joining the pair of stations which he is using.
(iii) The angle of intersection of the hyperbolic position lines.

It should be apparent from the inspection of any lattice chart that an inherent small equipment error, or a small personal error that may occur at the receiver will cause a geographical error of varying amount according to the observer's position.

It is important to realise that accurate equipment is no guard against the vagaries of the propagation of radio waves. The beacons and systems operating on medium and low frequencies are liable to " night error " in areas where the ground and sky waves are received with equal strength; these areas will occur at ranges depending upon the particular frequency used by any beacon or system. Where the transmissions of two stations are synchronised to provide one signal reading and position line, " night error " will be a minimum along the normal to the base line joining the pair of stations, and a maximum towards the limits of their service sector.

Little is yet known about the effects of hills and discontinuities in the terrain (such as cliffs) on the speed of medium- and low-frequency radio waves.

At the other end of the radio spectrum the transmissions of systems operating on the very high frequencies are subject to distortion in abnormal atmospheric conditions.

(*g*) *Fixing by radar*.—Radar may also be of considerable assistance when navigating in coastal waters in low visibility or at night. It is essential, however, to appreciate the limitations of a radar set when interpreting the information obtained from it. It must be remembered that the radar horizon is only slightly farther than the visual horizon would be, in good visibility, for a height of eye equal to the height of the radar aerial. Hence no echoes will be received from a coastline lying below the radar horizon, while echoes may be received from high ground farther inland which will give a misleading impression of the range of the nearest land.

Depending on the width of its beam, the bearings from a radar set tend to be inaccurate. It is therefore preferable when fixing by radar to use ranges rather than bearings. It is then most important to consider carefully the identity of the object giving the echo, using the bearing as an indication, and the height of the object to determine whether it will appear on the radar presentation. Radar Range Nomograms are useful in deciding this, but a satisfactory result can be obtained by using " Distance to Sea Horizon Tables."

When two or more objects on the radar presentation have been selected and positively identified, a satisfactory fix can be obtained by striking arcs on the chart with the radar range of the selected objects. These arcs intercept at the ship's position. Best results will be obtained by using isolated objects such as detached lighthouses, rocky islets, and the extremities of long piers or jetties, but where no such objects are available a steep coastline with cliffs should be used.

Flat or gently shelving coastlines, such as mud flats or sand dunes, should not be used since it is difficult to identify any portion of them on the radar presentation. Identification is assisted in some areas by fitting objects, such as buoys and beacons, with radar reflectors, causing them to return strong echoes. Attention is drawn to the symbols with which such objects are marked on Admiralty Charts, and which are given in the latest edition of chart No. 5011, " Explanation of signs and abbreviations used on Admiralty Charts."

The difficulty of positive identification of objects is largely reduced if a Chart Comparison Unit is used in conjunction with the navigational radar. Fixes obtained with this equipment employ, in principle, an infinite number of ranges of the terrain in the vicinity of the ship, and in so doing a satisfactory fix will normally be assured.

In addition, radar beacons are available in some areas. Details of these and their use are given in the Admiralty List of Radio Signals, Volume II.

(15) **Observations for errors of the compass.**—No opportunity should be neglected for checking the error of the compass. When coasting, and a well-surveyed and fairly large-scale chart is available, an excellent method of observing the error is by taking the compass bearing of two suitable objects when in transit, and comparing this with the charted bearing ; there should be sufficient distance between the objects to provide a sensitive transit. When this method is not available the error should be obtained by azimuths of a heavenly body. Errors should be observed on any change of course on which the ship is steadied for a reasonable time, and at least twice a day when steering a steady course for long periods.

(16) **Change of variation of the compass.**—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compasses placed on the charts for the purpose of facilitating plotting become in time slightly in error, and in some cases, such as with small scales or when the lines are long, the displacement of position from neglect of this change may be of importance. The compasses are re-engraved when the error amounts to a degree, but the chart plates cannot be corrected more frequently from the impossibility of making alterations often on one spot in a copper plate.

The geographical change in the variation is in some parts of the world sufficiently rapid to need consideration. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles, and in the English channel about 5° in 400 miles. The Variation chart should be consulted on this head.

On certain general charts embracing large areas with considerable change of variation, true compasses are placed instead of magnetic compasses, the variation being shown by *isogonic lines* (curves of equal magnetic variation), in a similar manner to the Variation chart. One or two *isogonic lines* are also sometimes placed on charts, in addition to the magnetic compasses, in order to indicate the general direction of these curves, and thus facilitate the determination of the variation to be employed in portions of the chart not in immediate proximity to any one of the engraved compasses. Magnetic variation values shown on Admiralty charts are for the 1st July of the year mentioned.

(17) **Local magnetic disturbance of the compass on board ship.**—The term " local magnetic disturbance " has reference only to the effects on the compass of magnetic masses external to the ship in

which it is placed. Observation shows that such disturbance of the compass in a ship afloat is experienced only in a few places on the globe. Magnetic laws do not permit of the supposition that it is the visible land which causes such disturbance, because the effect of a magnetic force diminishes in such rapid proportion as the distance from it increases that it would require a local centre of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetite ores in the bed of the sea under the ship, and when the water is shallow, and the force strong, the compass may be temporarily deflected when passing over such a spot, but the area of disturbance will be small, unless there are many centres near together. Such areas are depicted by a special symbol on charts, and the cause of the magnetic disturbance is referred to as a Local Magnetic Anomaly.

They may also be due to wrecks lying on the bottom in moderate depths, but investigations have proved that, while deflections of unpredictable amount may be expected when very close to such wrecks, it is unlikely that deflections in excess of 7° will be experienced, nor should the disturbance be felt beyond a distance of 250 yards.

It is very desirable that whenever a ship passes over an area of local magnetic disturbance, the position should be fixed, and the facts reported as far as they can be ascertained.

(18) **Use of oil for modifying the effect of breaking waves.**— Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skilfully applied, may prevent much damage both to ships (especially the smaller classes) and to boats, by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows :—

1. On free waves, i.e., waves in deep water, the effect is greatest.

2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances ; but even here it is of some service.

3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use ; crude petroleum is serviceable when nothing else is obtainable ; but all animal and vegetable oils, such as waste oil from the engines, have great effect.

4. A small quantity of oil suffices, if applied in such a manner as to spread to windward.

5. It is useful in a ship or boat, both when running, or lying to, or in wearing.

6. No experiences are related of its use when hoisting a boat up in a sea-way at sea, but it is highly probable that much time and injury to the boat would be saved by its application on such occasions.

At anchor, when the sea is sufficient to render it difficult to hoist up or in boats, oil bags from forward or from the swinging booms have been found to render the sea alongside comparatively smooth.

7. In cold water, the oil, being thickened by the lower temperature, and not being able to spread freely, will have its effect much reduced This will vary with the description of oil used.

8. The best method of application in a ship at sea appears to be: hanging over the side, in such a manner as to be in the water, small canvas bags, capable of holding from one to two gallons of oil, such bags being pricked with a sail needle to facilitate leakage of the oil.

The position of these bags should vary with the circumstances. Running before the wind they should be hung on either bow and allowed to tow in the water.

With the wind on the quarter the effect seems to be less than in any other position, as the oil goes astern while the waves come up on the quarter.

Lying to, the weather bow and another position farther aft seem the best places from which to hang the bags, with a sufficient length of line to permit them to draw to windward, while the ship drifts.

9. Crossing a bar with a flood tide, oil poured overboard and allowed to float in ahead of the boat which would follow with a bag towing astern, would appear to be the best plan. As before remarked, under these circumstances the effect cannot be so much trusted.

On a bar with the ebb tide it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside. The effect in this case must greatly depend upon the set of the current, and the depth of the water.

11. For a boat riding in bad weather from a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil is diffused well ahead of the boat, and the bag can be readily hauled on board for refilling if necessary.

12. Towing a vessel in a heavy sea, oil is of the greatest service, and may prevent parting the hawser. Distribute from the towing vessel forward and on both sides; if used only aft the tow alone gets the benefit.

(19) **Mirage and abnormal refraction.**—An unusual lapse rate of temperature (and therefore density as well) with height immediately above the sea (or land) surface produces a distortion in the appearance of objects near the horizon; such a phenomenon is known as mirage.

When the surface is relatively cold (and the wind very light) so that the density of the air decreases rapidly for a short distance above the surface, light rays from objects low down near the horizon are bent down, the same way in fact as are usually the rays of the sun when entering the earth's atmosphere at a low altitude. The effect is to render visible objects that are normally below the horizon, e.g., lights may be "raised" at night at much greater distances than one would ordinarily expect. This phenomenon is known as "looming."

A further occasional effect produced when the air is appreciably warmer than the sea, is "superior mirage" in which an inverted image is seen over the real object; sometimes an erect image is seen immediately above and touching the inverted one. The object and its images in this instance are well defined in contrast to the shimmering object and image of the inferior mirage. Superior mirage is most often experienced in high latitudes and wherever the sea surface temperature is abnormally low.

"Inferior mirage," the effect of which is to decrease the distance at which objects are visible in a horizontal direction, is due to a rapid increase of density with height close to the surface such as occurs when air of comparatively low temperature blows over a warmer sea, or over a tarred road or desert when a hot sun is beating down on it. In either event light rays are bent up when approaching the surface where the density of the air is much less than above. The coastline, and at times a ship or island, may appear to be floating in air above a shimmering horizon, possibly with, in the former instance, her hull either invisible or with an inverted image underneath. Inferior mirage is comparatively uncommon at sea and is more likely to be observed along a coastline than well out to sea.

When mirage is evident caution must be used in taking sights with a sextant, for abnormal refraction must necessarily be present also. With inferior mirage better, but not normal, results will usually be obtained by ascending as high as possible in the ship; with superior mirage the height of eye should be as low as possible. It is, however, advisable, whenever abnormal refraction is suspected, to measure the elevation of the celestial body above the back as well as the front horizon as explained in navigational text-books.

(20) **Aurora.**—The most common form of aurora is an arc system, single or multiple, narrow and well defined, or broad and diffuse, and centred on the magnetic meridian.

The most usual colour is pale whitish green when the auroral activity is weak and diffuse: but when the aurora arises high towards the zenith in the form of rays, rayed curtains and draperies with much rapid movement of the constituent rays, the colours sometimes become much stronger and more vivid, and include bright green, red and violet. When the curtains forming the aurora converge to form a corona, which may rotate very rapidly about the point of convergence, the displays may become very complex, filling practically the whole sky, and extending far to the equatorial side of the zenith with much rapid movement and change of colour from instant to instant.

Though the most usual duration of auroral displays in these high latitudes is several hours, they not infrequently last throughout the whole night from dusk to dawn. In such long displays the really intense and violently active periods with vivid strong colours are generally confined to spasms of 15–30 minutes, with the intervening periods filled with diffuse glows or quiet arc systems.

The absolute intensity of the light of the aurora is seldom great, and the brighter stars usually glimmer through it. In the most vivid and intense displays, the light may equal, but rarely surpasses, that of the full moon in a cloudless sky. It may give enough light to read by. On such occasions the aurora may be visible to some extent in partial twilight.

Though in high latitudes aurora occurs any time in the dark hours it is probably most frequent in the late evening hours from 9 p.m. till midnight or just after; it is more frequent in the equinoctial months than at other times and has a well-defined 11-year period of activity following the cycle of solar activity. The last maximum of activity was at the end of 1937 and the next maximum is likely to be about 1948–1949 with the intervening minimum years 1944–1945. In high latitudes this cycle of activity is reflected more in the intensity and vividness of the displays than in their frequency of occurrence. Though really outstanding displays tend to occur around the years of maximum activity they may occur at any time of the cycle, except perhaps near the absolute minimum.

In addition to this 11-year cycle of activity active periods tend to recur at intervals of 27 days, *see* Magnetic Storms.

Northern hemisphere.—Aurora Borealis occurs most frequently along a zone which forms an approximate oval, of average radius 23°, with centre in the extreme north-west of Greenland. This zone of maximum frequency crosses Hudson Bay and the Labrador coast in about lat. 58° N. It runs south of Cape Farewell and along the south coast of

Iceland. It lies just north of North Cape, touches the extreme north of Novaya Zemlya, skirts Cape Chelyuskin and then eastward just north of Wrangel island into the north of Alaska. Along this zone aurora of some kind can probably be seen every suitable night when the sky is clear; 250 miles outside this maximum zone to the southward the auroral frequency decreases sharply to about 70–100 nights a year on the average, and to 20–25 nights 500 miles south of the maximum zone. Inside the maximum zone the geographical distribution of frequency is not so well established but it probably falls off more gradually than it does outside.

On the zone of maximum frequency itself aurora appears as frequently to the south of the zenith as to the north, but with increasing distance outside the zone the appearances concentrate more into the northern sky; the reverse is true inside the zone.

Southern hemisphere.—The frequency and distribution of Aurora Australis is not fully known. It is probable that it is more frequently seen at sea between about long. 50° E. and 175° W. than in other longitudes. Very fine displays have occasionally been seen in Australasia and on passages across the Southern Ocean. There is nevertheless a general impression that aurora is less frequent in the southern than in the northern hemisphere. This is probably to be accounted for by the fact that, apart from whaling and exploring expeditions, ships' tracks in general do not extend to such high latitudes as in the northern hemisphere.

The zone of maximum auroral frequency is roughly annular and is near the circumference of a circle of radius about 1,080 miles, centred in about lat. 75° S., long. 129° E. The frequency falls off both outside and inside this zone. A large part of the zone is within the continent of Antarctica.

(21) **Magnetic storms.**—Magnetic storms vary in intensity and frequency with the sunspot cycle, similarly to aurorae. An intense magnetic storm is always accompanied by a bright and active aurora. The deeply coloured aurorae, showing more pronounced red and green, and sometimes also blue and violet, tints, are invariably connected with magnetic storms of considerable or great intensity. Such a storm will produce simultaneous aurora in both hemispheres. In the greatest storms aurorae in some form may be visible down to about 20° north latitude in certain parts of the oceans, especially between the meridians of 30° W. and 140° W. Magnetic storms vary greatly in duration from a few minutes to several days; they are generally more intense during the hours of darkness. Long-continued storms usually show great fluctuations with periods of complete or partial quiescence. Similarly the associated aurora fluctuates between active and quiescent forms.

The origin of magnetic storms and aurorae is not yet fully understood, but they are intimately connected with the state of a local area of the sun. As the same part of the sun is again presented to the earth after an interval of about 27 days, a magnetic storm and aurora may recur at this time, usually in less intense form.

A ship's compass may tend to deviate during the progress of a considerable magnetic storm. In more intense storms the compass needle may oscillate 1° or more either side of its normal position. Such oscillation may persist for as long as 10 or 20 minutes before dying out. Further oscillation may occur after a period of quiescence. Deviations of 2° or more are rare, but during the great magnetic storm and aurora of January 25th, 1938, one of 4° to the eastward was observed off the Portuguese coast. During a severe magnetic storm the compass may be deflected continually in one direction to the extent of about half a degree for some hours. When bright aurora is seen, especially if it is of the more deeply coloured and rapidly moving kind, and particularly when it is observed in low latitudes, the possibility of deflections of the compass should always be borne in mind.

During a considerable magnetic storm freak wireless reception may occur on certain waves and short-wave transmission may fade to complete silence. Beam radio communication, especially in a west-east or east-west direction, may be interrupted. Such conditions may last in some degree over a period of several days, at times when the sun is unusually active. Short-wave fading also occurs occasionally from a different form of solar disturbance known as a " bright eruption," when this is very intense. On the average such fading begins about 7 minutes after occurrence of the bright eruption and may last 5 or 10 minutes, gradually returning to normal within a period of 40 to 45 minutes. These fadings are confined to the daylight hemisphere of the earth, while the magnetic storm fadings may occur by day or by night.

GENERAL METEOROLOGY.

(All the following articles do not apply to every Pilot, but articles applicable to this Pilot will be referred to in the Climate and Weather Section in Chapter I.)

(1) **Lows.**—A low, or depression, appears on a synoptic chart as a series of isobars roughly circular or oval in shape, surrounding an area of low pressure. It is a main feature of the weather at sea in middle latitudes where it is responsible for most of the occasions of strong winds and unsettled weather, though not all depressions are accompanied by strong winds.

Lows vary very much in size and depth ; one may be only a hundred miles in diameter and another over two thousand miles ; some are deeper than others, a deep low being one in which the pressure is very much lower near the centre than on the outside whereas, on the other hand, a shallow depression is one where the pressure, although low near the centre, is not very much lower than in the surrounding districts.

Note.—The bracketed equivalents hereunder refer to the Southern Hemisphere.

In the northern (southern) hemisphere the winds blow round an area of low pressure in an anti-clockwise (clockwise) direction ; there is also a slight inclination across the isobars towards the lower pressure. Thus the well-known rule for the northern (southern) hemisphere is that when an observer faces the wind the direction of the lowest pressure is from 8 to 12 points to his right (left). The strength of the wind is in all instances closely related to the steepness of the barometric gradient or distance apart of the isobars ; the closer the isobars the stronger the wind.

Lows may move in almost any direction, though most often towards north-east (south-east) or east, at a speed of anything between 10 and 40 knots, though occasionally as much as 60, during the middle and most active stage of their existence ; they slow down when filling up (*see* "occlusion" below). The life of a low is in the region of 4 to 6 days.

There are usually one or more fronts, probably radiating from the centre, in the area covered by a low; each front on a synoptic chart represents a belt of relatively bad weather, accompanied by a veer (backing) of wind, which marks the change from the weather characteristic of one air mass to that of another. During the first two or three days of its life a low has a warm and a cold front, the area between the two being known as a warm sector because the air has come from a warmer locality than that which is outside the sector (see Fig. 1*a*). Warm air is lighter than cold air and it rises over the cold air ahead of the warm front as shown in Fig. 1*b*; this causes condensation of the water vapour in the warm air, forming at first cloud and later drizzle or continuous steady rain. The cloud spreads out ahead of the warm front, and the highest cloud, cirrus or mares' tails, is often about 500 miles ahead. At the rear boundary of the warm sector, known as the "cold front," the cold air is pushing under the warm air forcing the latter to ascend rapidly; this process is sometimes violent enough to produce squalls. The rapid ascent of the warm air causes the moisture to condense in the form of cumulo-nimbus clouds (shower clouds), from which heavy showers may fall. The cold front gradually overtakes the warm front so that the warm sector is eventually lifted up from the earth's surface. When this has occurred the low is said to be occluded, and the warm and cold fronts have merged into the third type of front known as an "occlusion" (*see* Figs. 2*a* and *b*). When a low has become occluded, it usually decreases in intensity and rate of travel, and gradually fills up. On the other hand, a low which has a marked warm sector is likely to be deepening, the winds associated with it may increase in force and its rate of travel may increase. Lows are usually travelling in a direction approximately parallel to the isobars (and in the direction of the wind) in the warm sector.

The approach of a low is indicated by a falling barometer. In the northern (southern) hemisphere, if the low is approaching from westward and passing northward (southward) of the ship, clouds appear on the western horizon, the wind shifts to a south-westerly (northwesterly) or southerly (northerly) direction and freshens, the cloud layer gradually lowers, and finally drizzle, rain or snow begins. If the low is not occluded, after a period of continuous rain or snow there is a veer (backing) of wind at the warm front, a rise of temperature and diminution or cessation of rain (or snow) in the warm sector, the visibility being usually moderate and the sky overcast with low cloud. The passage of the cold front is marked by the approach from westward of a thick bank of cloud (which however cannot often be seen because of the customary low overcast sky in the warm sector), a further veer (backing) of wind to west or north-west (south-west), sometimes with a sudden squall, rising pressure, a fall of temperature, squally showers of rain, hail or snow, and improved visibility (except during showers). The squally showery weather with a further veer (backing) of wind and drop in temperature may recur while the low recedes owing to the passage of another cold front or occlusion. If the low is occluded, the occlusion is preceded by the cloud of the warm front; there may be a period of continuous rain mainly in front of and at the line of occlusion, or a shorter period of heavy rain mainly behind the occlusion, according as the air in front of the occlusion is colder or warmer than that behind it. There may be a sudden veer (backing) of wind at the occlusion.

Often another low follows 12 to 24 hours later, in which event the barometer begins to fall again and the wind backs towards south-west (north-west), or even south (north).

If a low travelling eastward or north-eastward (south-eastward) is passing southward (northward) of the ship, the winds in front of it are easterly and they back (veer) through north-east (south-east) to north (south) or north-west (south-west); changes of direction are not likely to be so sudden as on the southern (northern) side of the low. In the rain area there is often a long period of continuous rain and unpleasant thick weather with low cloud. In winter in the colder regions the weather is cold and raw and precipitation is often in the form of snow.

Near the region of lowest pressure, lulls are sometimes experienced, but sudden changes are likely, and in a deep low the wind may increase in strength very rapidly, perhaps to gale force as the barometer begins to rise.

Sometimes in the air circulation of a large low, usually on the equatorial side and often on a cold front, a secondary depression develops, travelling in the same direction as the primary but usually more rapidly. The secondary often deepens while the original low decreases in intensity. In the region between the primary and the secondary depressions, the winds are not as a rule strong; but on the farther side of the secondary, usually the southern (northern) side, winds are likely to be strong and they may reach gale force. Thus the development of a secondary may cause gales at a greater distance from the primary than anticipated, while there may be only light winds where gales were expected.

The above is a brief general description of lows and the associated weather in temperate or middle latitudes of the northern (southern) hemisphere. It must be emphasised, however, that individual lows in different localities differ considerably from one another, according to the characteristics (especially the temperature and humidity) of the air currents of which they are composed, and the nature of the surface over which they are travelling.

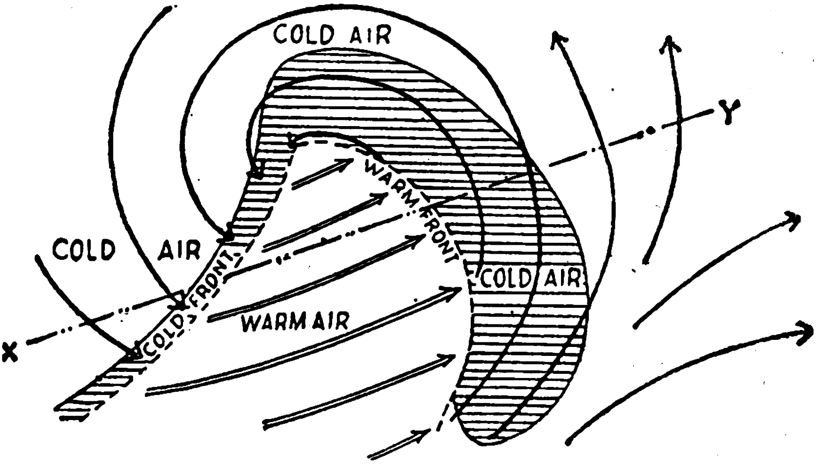
(2) **Tropical revolving storms.**—*Practical rules for avoiding them.*—These storms are so named because the wind blows round an area of low pressure situated at the centre. The direction of rotation is anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere. The wind does not revolve round the centre of the low pressure in concentric circles but has a spiral movement inwards, towards the centre.

A tropical storm is not so extensive as the depression of higher latitudes but, within 75 miles or so of the centre, the wind is often far more violent, and the high and confused seas near the centre may cause considerable damage to large and well-found ships, while small vessels (for example, destroyers) have foundered. The danger is still greater when ships are caught in restricted waters without adequate room to manœuvre. Due to torrential rain and sheets of almost continuous spray, visibility near the storm centre (but outside the "eye") is almost nothing. Within 5 to 10 miles of the centre the wind is light or moderate and variable, the sky is clear or partially so, and there is a heavy, sometimes mountainous, confused swell; this area is known as the "eye" of the storm.

Every ship navigating in an area subject to tropical storms during the period of their occurrence, should be constantly on the alert for any sign of their approach, so that steps can be taken to avoid the danger zone while there is still time and sea-room.

NORTHERN HEMISPHERE.

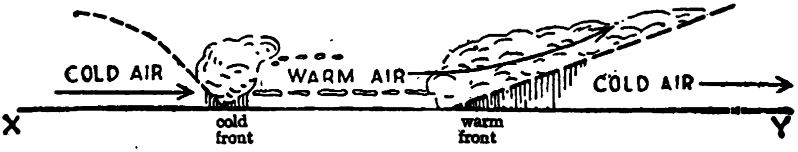
Fig. 1a.



Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.
The shading shows the areas where rain (or snow) is most probable.
Width of rain belt ahead of warm front is generally between 100 and 200 miles.

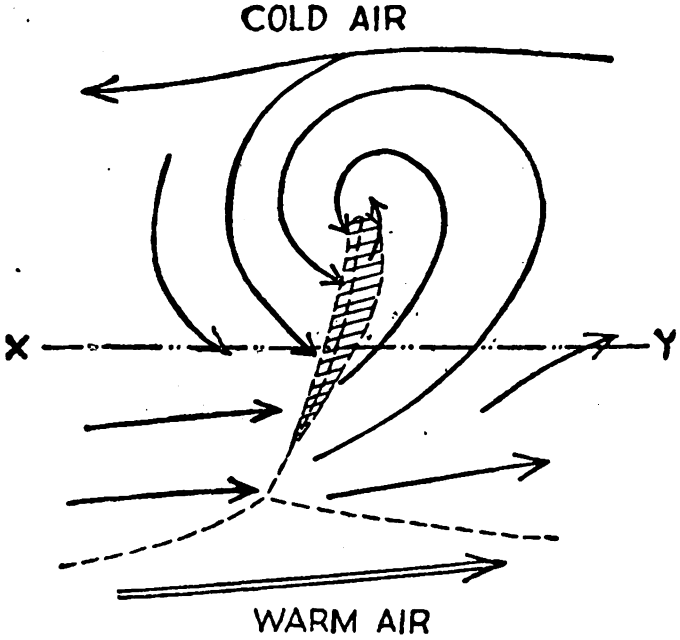
Fig. 1b.



Vertical section of the depression along the line XY.

[See over page.

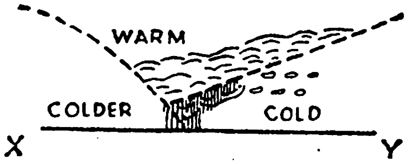
Fig. 2a.



Plan of an occluded depression.

The shading shows the region where rain (or snow) may be expected near the occlusion.

Fig. 2b.

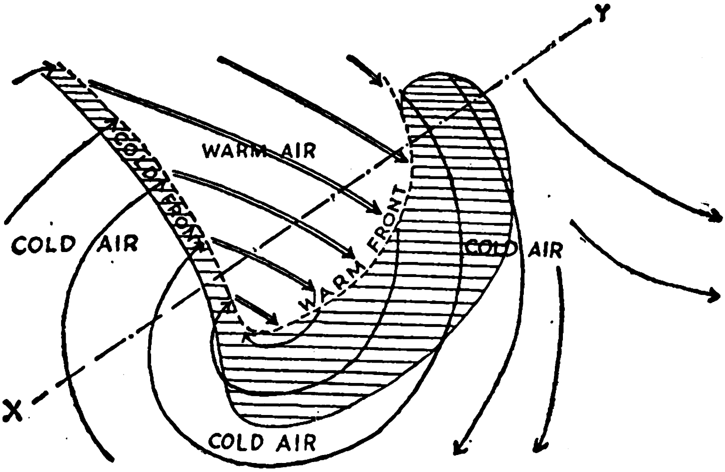


Vertical section of an occlusion of the cold front type.

The air in front of the occlusion is warmer than the air behind it.

SOUTHERN HEMISPHERE.

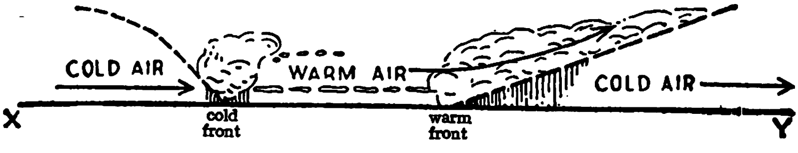
Fig. 1a.



Plan of a developed depression.

The double lines show the flow of the warm air, and the single lines the flow of the cold air.
The shading shows the area where rain (or snow) is most probable.
Width of rain belt ahead of warm front is generally between 100 and 200 miles.

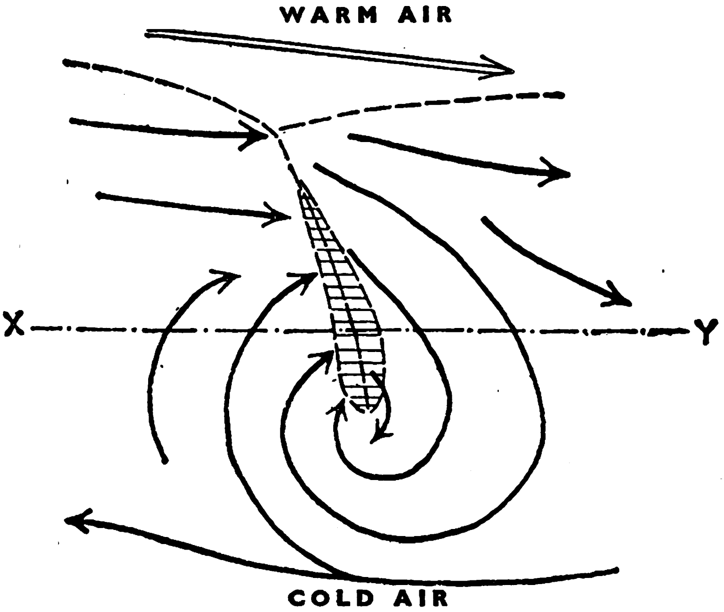
Fig. 1b.



Vertical section of the depression along the line XY.

[See over page.

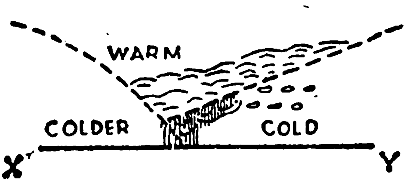
Fig. 2a.



Plan of an occluded depression.

The shading shows where rain (or snow) may be expected near the occlusion.

Fig. 2b.



Vertical section of an occlusion of the cold front type.

The air in front of the occlusion is warmer than the air behind it.

Localities, season, and average frequency.—Tropical storms occur for the most part on the western side of the oceans, though they are also experienced in the Bay of Bengal, off the north-west coast of Australia, and off the west coast of Central America. They are unknown in the South Atlantic. They are given various names according to the part of the World in which they occur.

Western North Atlantic	—hurricanes
Eastern North Pacific	
South Pacific	
Western North Pacific	—typhoons
Indian Ocean	—cyclones
Bay of Bengal	
Arabian Sea	
North-west Australia	—willy-willies

They are most frequent during the late summer and early autumn of their hemisphere; they are comparatively rare in the southern hemisphere from mid-May to November, and in the northern hemisphere from mid-November to mid-June. In the Arabian Sea, however, storms are most likely to occur at the change of the monsoon, i.e., October–November, and May–June, though they average only one or two a year. Out-of-season storms occur from time to time, particularly in the western North Pacific, where no month is entirely safe, and in the Indian Ocean, where one is reported south of the Equator perhaps once in two years outside the usual season. The following table shows approximately the average number of severe tropical storms recorded in 10 years in the several areas:

West Indies	50
Western North Pacific	250
„ South Pacific	30
Southern Indian Ocean	60
Bay of Bengal	20
Arabian Sea	10
Eastern North Pacific	30
West Coast of Australia	10

Variations in any one year amounting to 50% above or below the average are not unusual. Some of the figures quoted may be an underestimate since in the less-frequented parts of the world some storms may have escaped detection.

Origin, movement and extent.—Tropical storms originate as a general rule in the doldrums, between the parallels of 7° and 15° of latitude; those which affect the western part of the Pacific, South Indian and North Atlantic Oceans are first reported in the western third of those oceans, though there are exceptions such as in the North Atlantic during August and September where an occasional storm is known to begin near the Cape Verde islands. In the northern hemisphere they move off in a direction between 275° and 350°, though most often within 30° of due west. When in a latitude of 25° or so they usually recurve away from the equator and, by the time they have reached the 30th parallel, the track (or path as it is more usually called) is north-easterly. In the southern hemisphere they move off in a WSW. to SSW. direction (usually the former), recurve at about 15° to 20° S., and thereafter adopt a south-easterly path. Many storms, however, do not recurve but continue in a west-north-westerly (or west-south-westerly) direction until they reach the mainland, where they quickly die.

The speed of these storms is usually about 10 knots in their early stages, increasing a little with latitude; it seldom exceeds 15 knots before recurving, but thereafter 20 to 25 is usual, though speeds of 40 knots or even more have been known.

Occasionally storms move erratically, the path turning towards the equator, or adopting an easterly component in a low latitude, or even making a complete loop, but on these occasions its speed is low, usually less than 10 knots, while the unusual path is being followed.

The extent of the storm area varies considerably with individual storms, but generally speaking, winds of force 7 or more are improbable at more than 200 miles (especially on the equatorial side of the storm area), and force 8 unlikely to be exceeded at more than 100 miles, from the storm centre, at a latitude of less than 20°. Thereafter the radius increases with latitude so that these distances are nearly doubled on reaching the 35th parallel, but the intensity diminishes near the centre. Hurricane force winds are likely within 75 miles of the storm centre in the tropics, and gusts exceeding 150 knots have been reported in a few instances within 50 miles or so (except in the eye of the storm).

Warning of existence or approach.—In most instances, warning of the position, intensity and probable movement of a storm is given by radio at frequent intervals. (*See* Admiralty List of Radio Signals, Volume III.) Sometimes, however, there is insufficient evidence available for an accurate warning, or even a general warning, to be given, and ships must then be guided by their own observations. Of the following indications of the proximity of a tropical storm, the first is by far the most reliable within 20° or so of the equator; it should be borne in mind, however, that very little warning of the approach of an intense storm of unusually small diameter may be expected.

(*a*) If the corrected barometer reading is 3 mb. or more below the mean for the time of year, as shown in a climatic atlas or on the appropriate chartlets in the meteorological text of this Pilot, suspicion should be aroused and action taken to meet any development, such as raising steam in any available additional boilers, &c. It should be noted, however, that the barometer reading must be corrected not only for height, latitude, temperature and index error (if mercurial), but also for diurnal variation, the amount of which is given for each hour of the day in the Air Ministry climatic atlases and in the meteorological text of this Pilot. If the reading thus corrected is 5 mb. or more below normal, it is time to take avoiding action for there can be little doubt that a tropical storm is in the vicinity. According to an analysis of observations in the Western Pacific the centre of the storm is probably not more than 200 miles away. At this distance, at any rate in the China Sea vicinity, the wind has usually increased to about force 6.

When proceeding through an area liable to be visited by these storms it is desirable to take hourly readings of the barometer.

(*b*) An appreciable change in the direction and/or strength of the wind.

(*c*) A swell is sometimes evident, proceeding from a direction that approximates to the bearing of the centre. If ahead of the storm this indication may be apparent before the barometer begins to fall.

(*d*) Extensive cirrus cloud followed, as the storm becomes closer, by much alto-stratus cloud and subsequently fracto-cumulus or "scud."

(*e*) In addition there is the warning that can be given by Radar. Certain sets can display on the screen areas where moderate and heavy rain is falling. The greatest range to which this can be done at present is about 80 miles. Although moderate or heavy rain does not fall symmetrically all round a storm, it is continuous for at least 50 miles in a broad sector extending from the " eye " of the storm where there is a circular area of relatively light winds and clear or partially clear sky. By the time this final, and quite unmistakable, evidence of the exact position of the storm is available, the ship is already in fairly high seas, and is probably experiencing winds of force 9 or 10. It should be in time, however, to enable her to avoid the centre, on the edge of which conditions are worst of all.

Note.—In accordance with Article 35 of the International Convention for Safety of Life at sea it is the duty of every ship who suspects the presence or formation of a tropical revolving storm immediately to inform other vessels and shore authorities with all the means at her disposal. Weather reports should be made by radio at frequent intervals giving as much information as possible, especially corrected (***not*** for diurnal variation as in (*a*) above) barometer readings. If barometer readings are uncorrected this fact should be stated in the signal.

Information required by the seaman before deciding upon action to be taken.—To decide on the best course of action if a storm is suspected to be in the vicinity, a seaman requires to know :—

(*a*) the bearing of the centre of the storm ;
(*b*) the path of the storm ;
(*c*) the semicircle in which the ship is situated.

If an observer faces the wind, the centre of the storm will be from 9 to 11 points on his right-hand side in the northern hemisphere when the storm is about 200 miles away, i.e., when the barometer has fallen about 5 millibars and the wind has increased to force 6 or thereabouts ; as a rule the nearer one is to the centre the more nearly does the angular displacement approach 8 points.

The path of the storm may be approximately determined by taking two such bearings with an interval of from two to three hours between observations, provided that allowance is made for the ship's movement. It can, however, be assumed that the storm is not travelling towards the equator ; and, if in a lower latitude than 20°, its path is most unlikely to have an easterly component ; and, on the rare occasions when neither of these statements applies, the storm is moving very slowly. (Exceptions to this are most likely in the South Pacific, where the occasional storms often move off on a course almost due south which develops an easterly component at a latitude of about 15°, and in the western North Pacific in the instance of some of the out-of-season storms which may recurve at an early stage.)

The diagram headed " Typical Paths of Tropical Storms " (at the end of this article) illustrates the terms " dangerous semicircle " and " navigable semicircle." The former lies on the side of the path towards the usual direction of recurvature, i.e., the right-hand semicircle in the northern and the left-hand semicircle in the southern hemisphere. It is so called because a sailing or low-powered ship caught in it may be blown towards the path along which the storm will pass, or the storm may recurve and the centre pass over her. The navigable semicircle is that which lies on the other side of the path. A ship situated within this semicircle will tend to be blown away from the storm centre, and the recurvature of the storm will increase her distance from the centre.

Practical rules for avoiding tropical storms.—In whatever situation a ship may find herself, the matter of vital importance is to avoid passing within 50 miles or so of the centre of the storm ; it is preferable to keep outside a radius of 200 miles or more, because at this distance the wind does not often exceed force 7 (and is generally not more than force 6), and freedom to manœuvre is maintained. If a ship has at least 20 knots at her disposal, and shapes a course that will take her most rapidly away from the storm before the wind has increased above the point at which her movement becomes restricted, it is seldom that she will come to any harm.

Sometimes a tropical storm moves so slowly that a vessel, if ahead of it, can easily outpace it or, if astern of it, can overtake it. Since, however, she is unlikely to feel seriously the effects of a storm so long as the barometer does not fall more than 5 mb. (corrected for diurnal variation) below the normal, it is recommended that frequent readings should be made if the presence of a storm in the vicinity is suspected or known, and that the vessel should continue on her course until the barometer has fallen 5 mb., or the wind has increased to force 6 when the barometer has fallen at least 3 mb. If and when either of these events occurs, she should act as recommended in the following paragraphs, until the barometer has risen above the limit just given, and the wind has decreased below force 6. Should it be certain, however, that the vessel is behind the storm, or in the navigable semicircle, it will evidently be sufficient to alter course away from the centre.

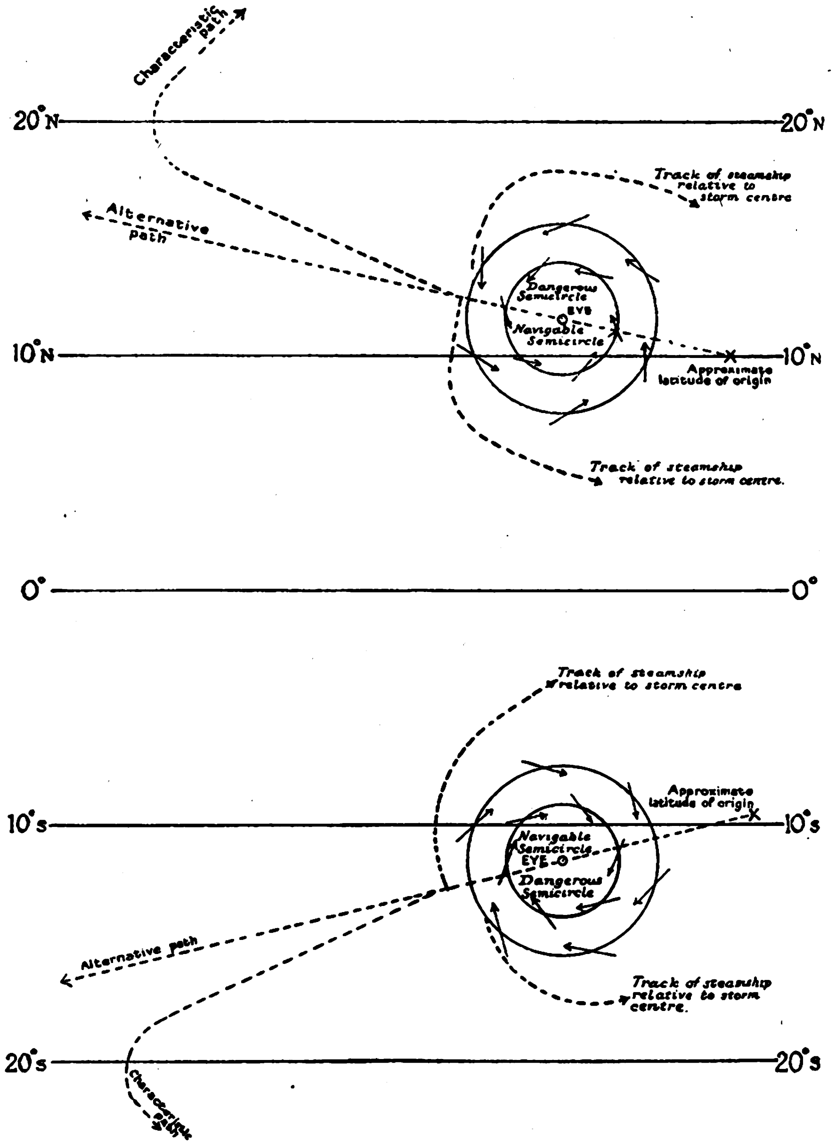
In the northern hemisphere.—(*a*) If the wind is veering, the ship must be in the dangerous semicircle. A steam or other power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed) on the starboard bow. A sailing vessel should heave to on the starboard tack. Either type of ship should haul round to starboard as the wind veers, thereby tracing a course relative to the storm as shown by the pecked line in the diagram.

(*b*) If the wind remains steady in direction, or if it backs, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path, particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a steam vessel should bring the wind well on the starboard quarter and proceed with all available speed. A sailing vessel should run with the wind on the starboard quarter. Either type of ship should alter course to port as the wind backs, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

In the southern hemisphere.—(*a*) If the wind is backing, the ship must be in the dangerous semicircle.—A steam or other power-driven vessel should proceed with all available speed with the wind 1 to 4 points (depending upon her speed and that usual for a storm in this latitude) on the port bow. A sailing vessel should heave to on the port tack. Either type of ship should haul round to port as the wind backs, thereby tracing a course relative to the storm as shown by the pecked line in the diagram.

(*b*) If the wind remains steady in direction, or if it veers, so that the ship seems to be nearly in the path (it is sometimes difficult to determine satisfactorily if indeed the ship is nearly in the path,

TYPICAL PATHS OF TROPICAL STORMS


Characteristic path
20°N
20°N
Track of steamship relative to storm centre
Alternative path
Dangerous Semicircle
EYE
Navigable Semicircle
10°N
10°N
Approximate latitude of origin
Track of steamship relative to storm centre.
0°
0°
Track of steamship relative to storm centre
Approximate latitude of origin
10°s
10°s
Navigable Semicircle
EYE
Dangerous Semicircle
Alternative path
Track of steamship relative to storm centre.
20°s
20°s
Characteristic path

Note.—In this diagram the isobars are shown as concentric circles about the eye; in practice this is usually the case within 150 miles or so of the centre. Outside this distance the isobaric form often loses its symmetry and strong winds often extend farther on the polar side than on the equatorial.

particularly if in the dangerous semicircle, because the wind does not always behave according to rule) or in the navigable semicircle respectively, a steam vessel should bring the wind well on the port quarter and proceed with all available speed. A sailing vessel should run with the wind broad on the port quarter. Either type of ship should alter course to starboard as the wind veers, thus tracing a course relative to the storm as shown by the pecked line in the diagram.

If there is insufficient room to run, when in the navigable semicircle, and it is not practicable to seek shelter, a vessel should heave to with the wind on the starboard bow in the northern hemisphere, and on the port bow in the southern hemisphere.

If in harbour, or at anchor, a seaman should be just as careful as at sea in watching the shifting of the wind and estimating the movement of the storm relative to himself, as by so doing he will be able to shift his berth with advantage or otherwise act according to circumstances. It is far preferable, however, to put to sea, if this can be done in sufficient time to avoid the worst of the storm. Riding out a tropical storm, the centre of which passes within 50 miles or so, in a harbour or anchorage, even if some shelter is offered, is an extremely unpleasant and hazardous experience, especially if there are other ships in company. Only if berthed alongside, or if special moorings and long bridles are used, can a ship feel secure.

Discretion must, of course, be used. In the case of a low-powered or small vessel with, for example, insufficient warning to enable her to gain sufficient distance from the storm by putting to sea, it will be preferable to remain in a reasonably sheltered harbour. If at sea and warning of an approaching storm is given and there is considered to be insufficient time or sea room to avoid the dangerous part of the storm area, it may be advisable for vessels of this type to seek shelter. In the China Sea, for example, there are so-called typhoon harbours which are listed in the Admiralty Pilot. In all cases, however, the seaman must use seamanship and initiative.

(3) **Local modification of the weather near the coast.**—The information given in Chapter I on climate and weather in the area covered by the Pilot refers necessarily to the coastal and sea regions generally but cannot attempt to deal with the local effects on the wind and weather of each separate headland, bay, or creek. The following notes, however, should prove helpful in showing how the weather in the general vicinity is likely to be modified by the topography or shape of the land close to the actual place in which the mariner is concerned.

(i) If the coastline is steep-to, onshore winds that approach it at an angle are usually deflected nearly along the shore and increased somewhat in speed. And when the wind approaches a strait whose direction is somewhat similar to that of the wind, the wind tends to blow along the strait and increases in speed as the strait narrows.

When a strong wind blows directly towards a very steep coast, there is usually a narrow belt of contrary gusty winds close to the coast.

(ii) Similarly when the wind blows onshore towards the entrance to a wide estuary, especially one with hills on both sides, it generally tends to blow up the estuary. This effect is most marked in the afternoon but there is often no such tendency during the night and early morning.

(iii) An offshore wind is often squally on the lee side of hilly coasts, especially when the air is much colder than the sea, as for example when it blows off snow-covered land and when the wind over the open sea is force 5 or more.

(iv) Near headlands or islands with steep cliffs there may be large changes in direction (up to about 90°) and speed of the wind in addition to those mentioned above.

(v) During quiet and warm weather with clear or fairly clear skies, a sea breeze is of common occurrence during the warmer part of the day; it is especially frequent in the tropics and sub-tropics. It blows onshore from, on the average, 4 to 8 hours after sunrise until shortly before sunset, reaching its maximum development during the afternoon (1300 to 1600); if there is an appreciable regional or general wind, then this will be modified by the onshore sea breeze. Under particularly favourable circumstances such as high day temperatures, relatively cool sea, and hilly background to coast, the sea breeze may blow as much as force 4 (occasionally 5) and extend 20 miles or more to seaward from the shore. At night under similar circumstances a lighter breeze blows from the land to the sea; it seldom extends more than 5 miles from the shore nor does it become appreciable much before 2200 local time; under favourable conditions, as in the tropics, it usually lasts until an hour or so after sunrise.

(vi) When sea fog that is caused by the passage of warm air over a colder sea surface is general over the open sea, visibility is better close to leeward of a hilly island or promontory than to windward. This effect is most marked in late spring and summer, during the early afternoon when the land is at its warmest, and this applies to low-lying land as well.

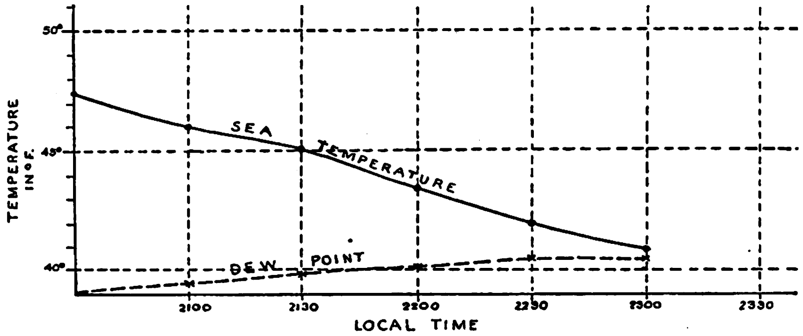
(vii) Radiation fog which forms over land on quiet nights with clear skies, mainly in autumn and winter, and sometimes spreads a few miles out to sea, is least thick during the afternoon and is often worst during the first hour or two after sunrise.

(4) **Forecasting sea fog.**—The most frequent type of fog in the open sea is that caused by relatively warm air flowing over a colder sea. Warning of this type of fog may be obtained by frequent observations of air and sea surface temperatures; if the sea temperature falls below the dewpoint of the air, fog is almost a certainty. The following procedure is recommended whenever the temperature of the air is higher than, or about equal to, that of the sea, especially at night when approaching fog cannot be seen until shortly before entering it.

Sea and air (both dry and wet bulb) temperatures should be observed at intervals of about 5 miles and the sea temperature plotted against dewpoint. The dewpoint is obtainable from tables published in various text-books, but at temperatures up to about 60° F. a close enough approximation may be obtained by assuming it to be the same amount below the wet-bulb temperature as the latter is below the dry-bulb temperature; for example, if the dry bulb reads 50° F. and the wet bulb 48°, the dewpoint is about 46°. If the curves of sea temperature and dewpoint converge, fog may be expected by the time at which they coincide.

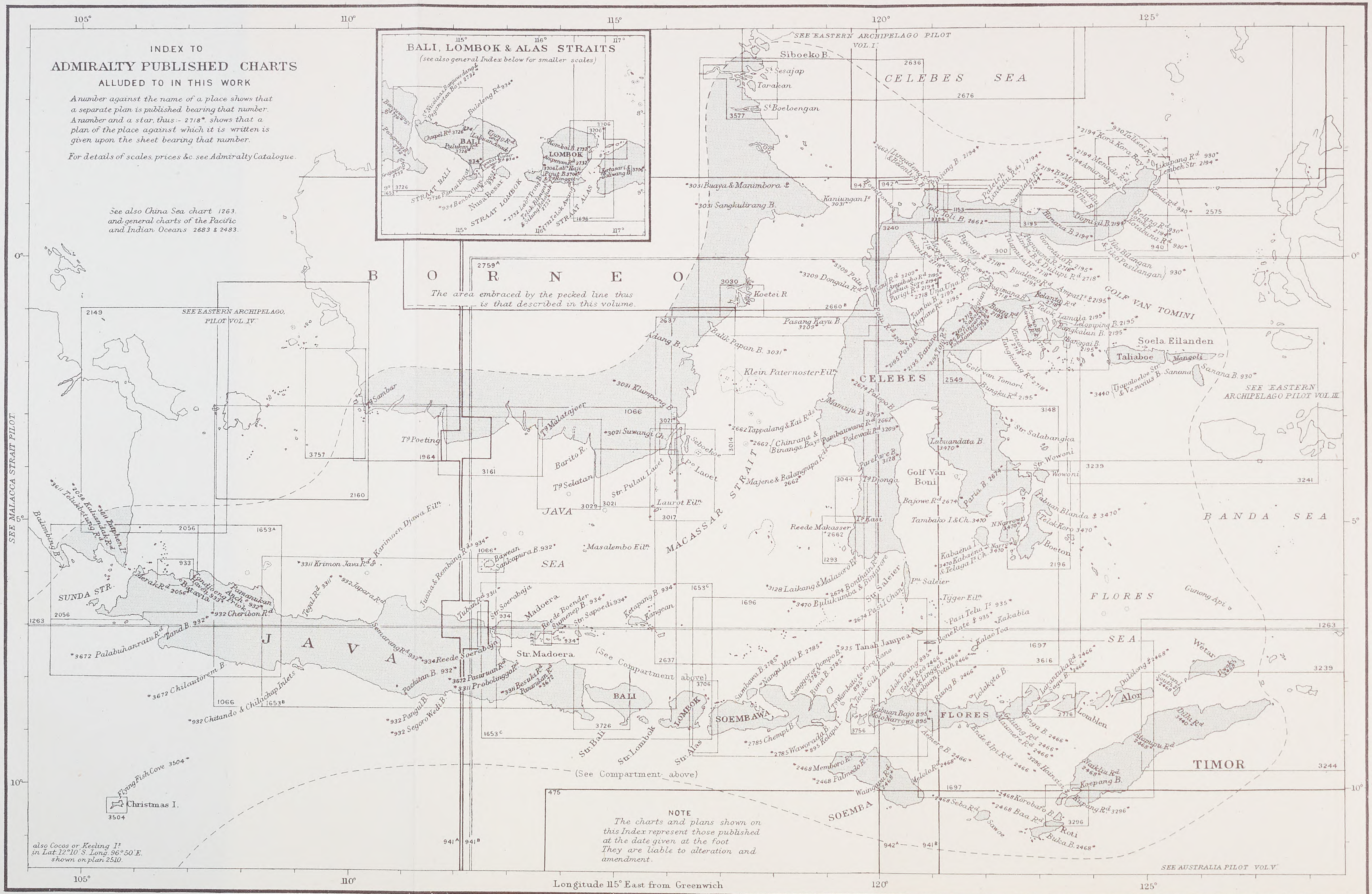
The figure below represents conditions that might be found by a low-powered ship in about long. 40° W. proceeding westward on the appropriate lane route for Halifax, Nova Scotia. At 2200 it would become evident that there is a probability of running into fog in about an hour's time, assuming that the sea temperature continues to fall at about the same rate that it has done during the last 1½ hours.

From the appropriate chart of average sea surface temperatures it can be seen where a rapid fall of temperature may be expected, so that if the dewpoint is within 5° or so of the sea temperature when approaching the colder water zone, this will also give a fairly reliable warning of fog.



If it is desirable and practicable to escape from fog, a ship should steer for warmer water which will again be evident from the charted isotherms.

Fog, or very poor visibility, at sea may also occur in snow or heavy rain, or in association with the passage of a warm front or occlusion, or, when within 20 miles or so of land, it may occur as a result of radiation fog extending from the land; in high latitudes in winter, sea smoke may be met near land, when very cold offshore winds are blowing, or near extensive ice. The method described above will not give warning of these fogs, of which frontal fogs, though common in middle latitudes, are neither so extensive nor so persistent in any one locality, and the other fogs mentioned are rarely encountered far from land (or extensive ice).



INDEX TO
ADMIRALTY PUBLISHED CHARTS
ALLUDED TO IN THIS WORK
A number against the name of a place shows that a separate plan is published bearing that number.
A number and a star, thus:- 2718*, shows that a plan of the place against which it is written is given upon the sheet bearing that number.
For details of scales, prices &c. see Admiralty Catalogue.
See also China Sea chart 1263, and general charts of the Pacific and Indian Oceans 2683 & 2483.
BALI, LOMBOK & ALAS STRAITS
(see also general Index below for smaller scales)
The area embraced by the pecked line thus is that described in this volume.
SEE EASTERN ARCHIPELAGO PILOT VOL. I.
SEE EASTERN ARCHIPELAGO, PILOT VOL. IV.
SEE EASTERN ARCHIPELAGO PILOT VOL. III.
SEE MALACCA STRAIT PILOT
SEE AUSTRALIA PILOT VOL. V.
NOTE
The charts and plans shown on this Index represent those published at the date given at the foot. They are liable to alteration and amendment.
also Cocos or Keeling Is in Lat. 12°10' S. Long. 96°50' E. shown on plan 2510.
Longitude 115° East from Greenwich
105°
110°
115°
120°
125°
0°
5°
10°
BORNEO
CELEBES
CELEBES SEA
JAVA
JAVA SEA
MACASSAR STRAIT
GOLF VAN TOMINI
BANDA SEA
FLORES SEA
SUNDA STR.
BALI
LOMBOK
SOEMBAWA
FLORES
SOEMBA
TIMOR
Alor
Wetar
Roti
Madoera
Soela Eilanden
Taliaboe
Mangoli
Boeton
Christmas I.
Flying Fish Cove 3504*
Str. Bali
Str. Lombok
Str. Alas
Str. Madoera
(See Compartment above)
Golf Van Boni
Klein Paternoster Eiln.
Masalembo Eiln.
Karimoen Djawa Eiln.
Gunong Api

May 1949

IMPORTANT.

Details of Lights, Fog Signals, and Time Signals (visual) are not included in this volume; for this information the Admiralty List of Lights, Vols. 6 and 10, should be consulted.

Information regarding Vertical Movement of the Water is not included; for this the Admiralty Tide Tables should be consulted.

Details of Radio information (weather bulletins, storm and navigational warnings, time signals, fog signals, and D.F. stations) are not included; for this information the Admiralty List of Radio Signals should be consulted.

EASTERN ARCHIPELAGO PILOT, VOL. II

CHAPTER I

GENERAL INFORMATION — CURRENTS — TIDAL STREAMS — GENERAL SYSTEM OF BUOYAGE—COMMUNICATIONS—SHIPPING — FUEL — STANDARD TIME — CONSULS — PILOTAGE — SIGNALS — SUBMARINE CABLES — REGULATIONS — DERATISATION — PASSAGES — CLIMATE AND WEATHER — CLIMATIC TABLES

GENERAL REMARKS.—This work contains a description of the Cocos or Keeling islands, Christmas island, and a portion of the Eastern Archipelago, namely, Java and the islands eastward, as far as and including Timor; also the Java and Flores seas; the southern and eastern coasts of Borneo; Macassar strait; and Celebes.

The western limit commences with Sunda strait, and the eastern limit ends with the east coast of Celebes, Soela eilanden, and Timor with its adjacent islands.

With the exceptions of the Cocos or Keeling islands, Christmas island, and a portion of Timor, all the islands dealt with in this volume form a part of Oost-Indische Archipel. The latter is divided into two main divisions, the first comprising Java and Madoera, the second the so-called external possessions (Buitenbezittingen), and these are further subdivided into "Residencies."

COCOS ISLANDS.—The Cocos or Keeling islands are two groups of low coral islands, of the atoll type, 15 miles apart, and nearly 600 miles south-westward of Sunda strait. The southern, and larger group, is inhabited; copra is the sole export.

These islands were discovered in 1608 by Captain William Keeling in the service of the East India Company, but were little known previous to the visit of Captain J. Clunies Ross, of the ship *Borneo*, who partially refitted his ship here in 1825. Captain Ross returned to the islands in 1827 with some Scottish colonists, but found them occupied by Alexander Hare, who, with a large number of Malay followers, had arrived the same year. The two factions lived on bad terms, and many of Ross' colonists left the place owing to its being already occupied, but eventually the Ross influence became the stronger, and Hare, deserted by his followers, left. The Ross family now own the islands.

In 1836, the Cocos islands were visited by Captian Robert Fitzroy, who surveyed the group, the chart of which appears to be still correct in its main features, but the head of the lagoon was reported, in 1944, to have silted up.

In 1857, Captain Stephen G. Fremantle, in H.M.S. *Juno*, formally annexed the group to the British Crown. In 1878, the islands were placed under the government of Ceylon. In 1886 they were transferred to the government of the Straits Settlements, and annexed to the Settlement of Singapore in 1903, but, in 1942, they reverted to the Ceylon Government.

CHRISTMAS ISLAND.—Christmas island lies about 220 miles southward of the south-western extremity of Java, and is near the track of sailing vessels bound for Sunda strait from the Cape of Good Hope between April and September, and to those bound southward from Sunda strait during the period of the North-west monsoon.

The East India Office Records contain a letter from a Captain William Mynors, stating that he sighted this island on Christmas day, 1643, and gave it the name of Christmas island. It is also shown on a map by Pieter Goos, published in Holland in 1666, on which it is named Moni. In 1688, Dampier landed on the island, and an account of it is given in his " Voyages." Christmas island was annexed to the British Crown by Captain W. H. May, R.N., in H.M.S. *Imperieuse*, on 6th June, 1888; it is a dependency of the Straits Settlements. The estimated population of the island, in 1941, was 11,440, including 27 Europeans.

A settlement was first formed in 1888, in Flying Fish cove, on the northern side of the island, when coconut trees were planted along the shore, and coffee, cocoa, and pepper in clearings behind; these grew in profusion, but are no longer exported. Large deposits of phosphate of lime exist on the island, and this is now the sole export.

OOST-INDISCHE ARCHIPEL.—The history of the present-day Oost-Indische Archipel appears naturally to fall into two great periods, the dividing line of which lies in about the year 1500. In the period before that date Hinduism held supreme sway in the most important islands; towards the end of the fifteenth century Islam had to a great extent superseded Hinduism, and at the same time the first conquerors from Europe, the Portuguese, arrived. In 1596, the Dutch arrived on the scene, and early in the seventeenth century the Netherlands East India Company acted as the principal political power in the archipelago; by the end of that century it had gained absolute control. A century later these colonies were annexed by the State, so that in the nineteenth and twentieth centuries they formed part of the Netherlands kingdom.

Oost-Indische Archipel is one of the most important volcanic territories of the entire globe; Sumatra and Java form a portion of a volcanic arc which continues eastward throughout Kleine Soenda eilanden. This recent volcanism has made the soil of Java so fertile that it is one of the most densely populated agricultural areas of the world. The total population of Oost-Indische Archipel, in 1930, was 60,731,025.

The chief products are mineral oil, rubber, sugar, coffee, palm oil and tea.

Sumatra.—Only the small portion at the south-eastern end of Sumatra, forming the northern side of Sunda strait, is dealt with in this work. The chief town and seat of Government of this part, known as the Lampoeng district, is Teloekbetoeng, situated at the head of Lampoeng baai. The population of Sumatra, in 1930, was 7,677,826, including 28,707 Europeans.

Java.—Java is by far the most important of the islands in Oost-Indische Archipel, and from a very early period has been the seat of a more or less advanced civilisation; records concerning it, however, do not go back further than the fourth century. The great Javanese sea trade began in the eleventh century. In 1595, after prolonged preparations, the first Dutch Mercantile fleet put to sea under the command of Cornelis de Houtman, and arrived at Banten, on the north coast of Java, which was then the great emporium for trade with east and west, in 1596. A number of further enterprises followed, and Batavia, which has remained the seat of the Netherlands Government throughout, was founded in 1619.

The north coast of Java is somewhat low and comparatively sheltered; it is indented by many bays, but none of them penetrates deeply, so that there is only one good harbour, that of Surabaya, known by the Dutch as Soerabaja, which is formed by the strait separating Java and Madoera. The south coast is bold and precipitous, less indented than the north coast, and is exposed to a heavy and dangerous surf which rolls in at all seasons; this coast is, therefore, little frequented, having no safe harbours except that of Tjilatjap (Chilachap) and in Segoro Wedi baai. The principal ports in Java are Batavia, Surabaya, Semarang, Cheribon, and Tjilatjap.

A range of volcanic mountains traverses the entire length of Java, the peaks varying in elevation from 3,000 to 12,000 feet ($914^{m}4$ to $3{,}657^{m}6$); many of these are in a state of more or less activity. Earthquakes are frequent, and there are many warm mineral springs. There are numerous rivers, especially on the northern side, but none of them is navigable for vessels of any size, and only a few are available for boats; the mouths are all more or less obstructed by bars of mud or sand.

The climate of Java is hot and uniform, as might be expected from its geographical position, but the elevated plains and plateaux, rising from 1,000 to 5,000 feet ($304^{m}8$ to $1{,}524^{m}0$) above the sea, afford a variety of climates. On the north coast the wet season is from November to April, when the North-west monsoon blows, and the dry season from May to October, during the prevalence of the south-east winds; on the south coast the seasons are more irregular. The period of change of the monsoons is often unsettled and tempestuous, with violent thunderstorms. Land and sea breezes are experienced within 15 miles of the northern and southern coasts, while in some parts of the eastern and narrowest extremity, the South-east monsoon blows with great force across the entire island.

The native inhabitants of Java are all of Malay race, but are divided into three nations, speaking distinct but allied languages. These are the Sundanese, of western Java; the true Javanese, of central and eastern Java; and the Madurese, of the island of Madoera and the adjacent parts of the larger island. Physically, however, they are all nearly alike and are hardly distinguishable from the Malays of the other great islands and of the peninsula of Malacca, except that they are somewhat taller and better made.

In 1930, the population of Java and Madoera was 41,718,364, including 192,571 Europeans. All towns in Java are accessible by rail, and the island is well supplied by good motor roads.

The chief productions of Java are sugar, rubber, coffee, tea, copra, and tobacco.

Kleine Soenda eilanden.—From the eastern end of Java, Kleine Soenda (Lesser Sunda) eilanden extend in a straight line for over 600 miles to the eastern end of Alor and to the large island of Timor, which lies somewhat obliquely to the direction of the line; Wètar and the adjacent islands lie northward of the eastern part of Timor. The entire group presents a very different aspect from most other parts of the Oost-Indische Archipel, and especially from the Moluccas, being deficient in verdure, for the most part without forests, and often absolutely barren; this deficiency of forests begins even in Bali, so close to luxuriant Java, and is more apparent farther eastward, till on Timor the growth consists chiefly of dense thickets of thorny shrubs, with trees only in some of the moister ravines.

Borneo.—Borneo occupies a central position in the Eastern Archipelago, being almost equally accessible from Sumatra, Java, Celebes, the Philippines, and Singapore. It has an area of about 290,000 square miles, of which 210,285 square miles belong to the Netherlands. Although lying in the centre of the great volcanic belt of islands which constitutes the Eastern Archipelago, Borneo differs wholly from them in not possessing a single active volcano, so far as is known. Its mountains consist of many short and irregular ranges, radiating from one central chain traversing the island from south-south-west to north-north-east; this chain has peaks from 5,000 to 6,000 feet ($1,524^{m}0$ to $1,828^{m}8$) high, and terminates near the northern end of the island in Kinabalu, 13,450 feet ($4,099^{m}6$) high.

The largest rivers are the Kapoeas, on the western side, the Barito, on the southern side, and the Koetei, Beraoe, Boeloengan, and Sesajap, on the eastern side; all these rivers have numerous tributaries, and, in their lower reaches, flow in winding channels through a vast extent of forest-covered, alluvial plains. The principal ports are Pontianak (*see* China Sea Pilot, Vol. II), Bandjermasin, Balik Papan and Tarakan; the latter is the main export place for oil.

The aborigines of Borneo are of Malay race, and are generally known as Dyaks, but they are divided into numerous tribes, speaking distinct languages; they scarcely differ physically from other Malays, except that they are generally lighter in hue and are more active. Several other races have settled in Borneo, which, owing to its central position, has naturally become the receptacle of wanderers from the surrounding islands. In 1930, the total population of Dutch Borneo was 2,168,661, including 5,765 Europeans.

The chief exports are rubber, tobacco, copra, and other agricultural products; the production of mineral oil is increasing steadily, and tin, coal, and gold are also found.

The climate of the greater part of Borneo is humid and oppressive, with uniformly high temperatures, although in the hills and interior regions a comparatively temperate climate may be found. The island is probably only a little less healthy for Europeans than Java, but fevers, dysentery, and numerous other diseases are prevalent amongst the natives.

Celebes.—Celebes is the fourth island in magnitude in the Eastern Archipelago, being only surpassed by Borneo, New Guinea, and

Sumatra; its shape is peculiar and fantastic, consisting of a central body from which radiate four long, narrow arms, forming three large gulfs on the eastern side. Celebes is traversed by a series of parallel mountain ranges with a general north and south trend; between the ranges lie extensive plateaux or wide valleys containing a number of lakes. The extremity of the northern peninsula is the only part where active volcanoes are known to exist, the highest of these, named Kalabat, attains an elevation of 6,634 feet (2,022^{m}1), but no recent eruptions have been recorded anywhere except on Oena Oena (Una Una), an island in Golf van Tomini, in 1898.

By far the most important of the peninsula of Celebes is the south-western, which is bounded westward by Macassar strait and eastward by Golf van Boni. A chain of mountains runs through this peninsula, as in the others, and in the southern part is Lompo Batang, 9,513 feet (2,899^{m}6) high. The town of Makasser, on the south-western side of this peninsula, is one of the most important places of trade in Oost-Indische Archipel.

The northern peninsula is a long, narrow strip of land, rugged and mountainous, which forms the northern side of Golf van Tomini. The north-eastern extremity constitutes the fertile and highly cultivated district of Minahasa, the capital of which is Menado.

The eastern peninsula, bounded northward by Golf van Tomini and southward by Golf van Tomori, is the least exploited. A chain of islands, including the Banggai archipel and Soela eilanden, extends eastward from this peninsula for over 200 miles.

The south-eastern peninsula, which forms the eastern side of Golf van Boni, is prolonged southward by the mountainous islands Kabaëna, Moena (Muna), and Boeton (Buton); south-eastward of the latter are the Toekang (Tukang) Besi eilanden.

It is highly probable that a low and primitive race did once inhabit Celebes; but if so it has completely disappeared, and the whole island is now occupied by many distinct tribes in various stages of civilisation, but all belonging to the Malayan race. They may be roughly classed into two groups—the Muhammadan semi-civilised tribes, and the Pagans, who are all more or less savages. The former all read and write, and mostly use peculiar alphabetic characters; they have fixed governments, regular clothing, and are considerably advanced in agriculture and the arts, being, in fact, the equals of the true Malayas. The latter are more or less complete savages, without writing or fixed governments, usually with imperfect bark clothing, and without the arts of weaving or working metals. The most important of the Muhammadan tribes are the Bugis, Mandars, and Makassers. The Bugis occupy the eastern coast and a great deal of the interior of the southern peninsula, their chief town being Boni. They are governed by a Rajah, and have a peculiar language and character. The Mandars, speaking another language, occupy the western portion of the island which projects out into Macassar strait northward of Tanjong Mandar. The Makassers inhabit the southern and western extremity of the peninsula; their chief town, and the residence of the Rajah, is Goa, only a few miles from Makasser, the Dutch capital of Southern Celebes. The Makasser people speak a quite distinct language, and even the character in which they write differs from that used by the Bugis. Allied people, but speaking two distinct languages, inhabit the islands of Saleier, at the extremity of the southern, and Boeton, off the end of the south-eastern peninsula.

The total population of Celebes, in 1930, was 4,231,906, including 7,921 Europeans.

CURRENTS.—The currents in the greater part of the area covered by this volume are wind-drifts produced by the monsoon blowing seasonally; these currents are therefore reversed in direction with the alternation of the monsoons. Observations of current so far available are not sufficient to give exact information. Figures 1–4 on pages 7 and 8 show the general circulation in January, April, July and October, respectively. In common with the monsoon drifts of other regions, the currents show a considerable degree of variability. Not only do they vary according to the actual strength and direction of the monsoon at the time, but currents in other directions, including those in opposition to the monsoon drift, are sometimes experienced.

Java sea.—During the South-east monsoon, from May to September, the predominating direction of current is westerly. During the North-west monsoon, from November to March, the predominating direction is easterly. October and April are transition months, *see* Figures 2 and 4 on pages 7 and 8, respectively. There is no appreciable difference of the average rate of the west-going or east-going currents. The west-going current reaches its greatest average rate of about half a knot in June and July and the west-going current reaches the same rate in December and January. After a slight weakening in February, the east-going current may be found running stronger again in March, especially along the north coast of Java. The maximum rates experienced in the open sea are about 2 knots during either monsoon.

Flores sea.—The west-going current runs from June to October and the east-going current from December to May. November is a transitional month. As the current is predominatingly easterly in May and westerly in June, the second transition period must be very rapid, occurring probably about the last week in May and the first week in June. In this sea, both the west-going and east-going currents are on the average a little stronger than those of the Java sea. The east-going current is somewhat stronger than the west-going one, its average rate during December to May being about 16 miles per day, i.e. nearly three-quarters of a knot. Maximum rates of two and a half knots, or more, have occasionally been recorded.

Sunda strait.—A south-westerly current sets through this strait, from the Java sea to the Indian ocean, in all months of the year except November, when its direction is reversed to north-east. The horizontal water movement in the strait is a resultant of this current and the tidal stream, *see* page 43.

Macassar strait.—A southerly current, not of monsoonal origin, flows through this strait throughout the year. In the southern part of the strait, the direction of this current is influenced by the prevalent monsoon, and is south-westward during the season of west-going current in the Java and Flores seas, and south-eastward during the season of east-going current in those seas (*see* page 380). The Macassar strait current is derived ultimately from the North Equatorial current of the Pacific ocean. Part of the latter current branches southward along the east coast of Mindanao throughout the year. This branch enters the Celebes sea, round which it sets in a counterclockwise direction, emerging therefrom to form part of the Equatorial countercurrent of the Pacific ocean. A part of the south-going water on the western side of the Celebes sea branches off to flow southward through Macassar strait. In accordance with this general circulation of the

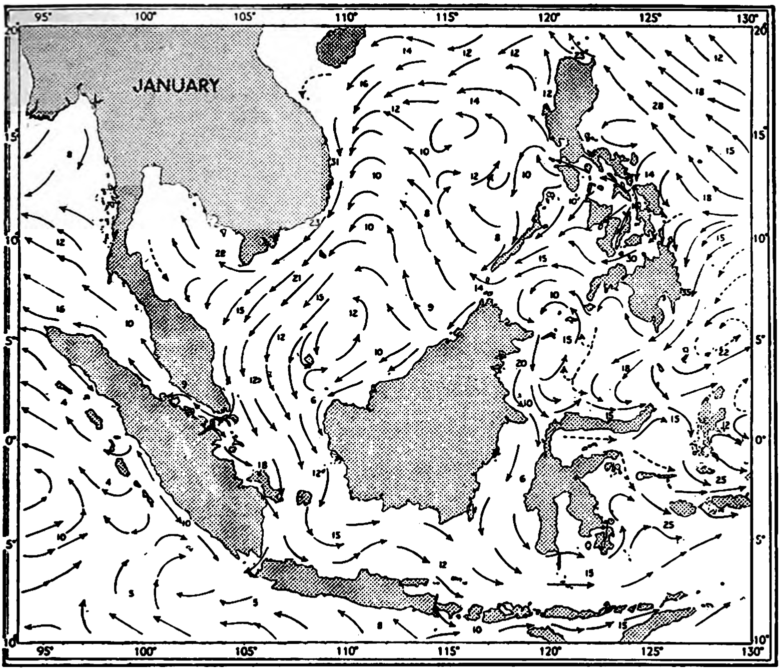

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Fig. 1

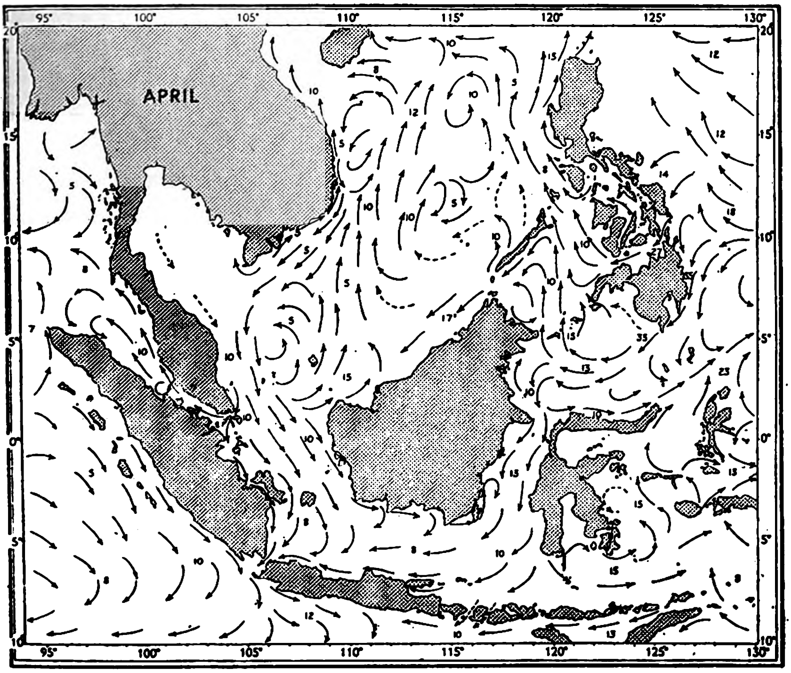
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Fig. 2

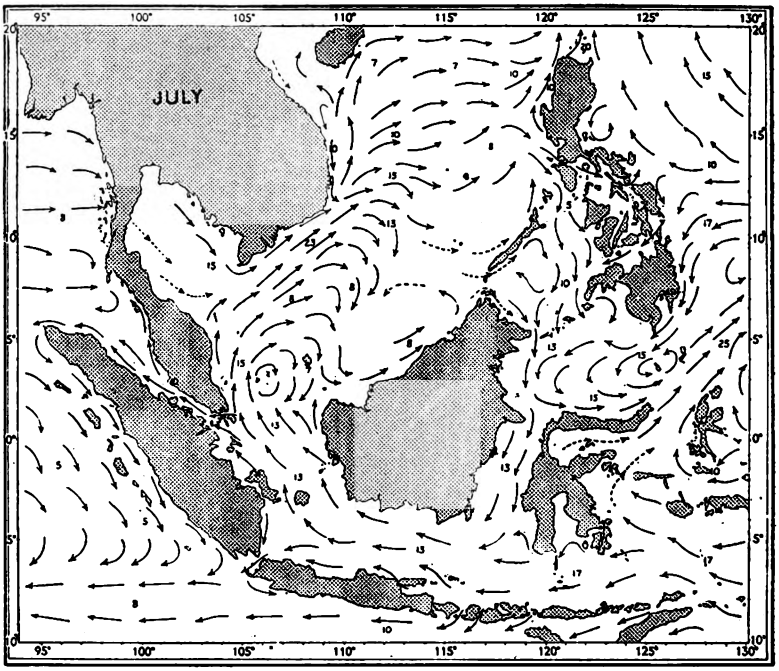
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Fig. 3

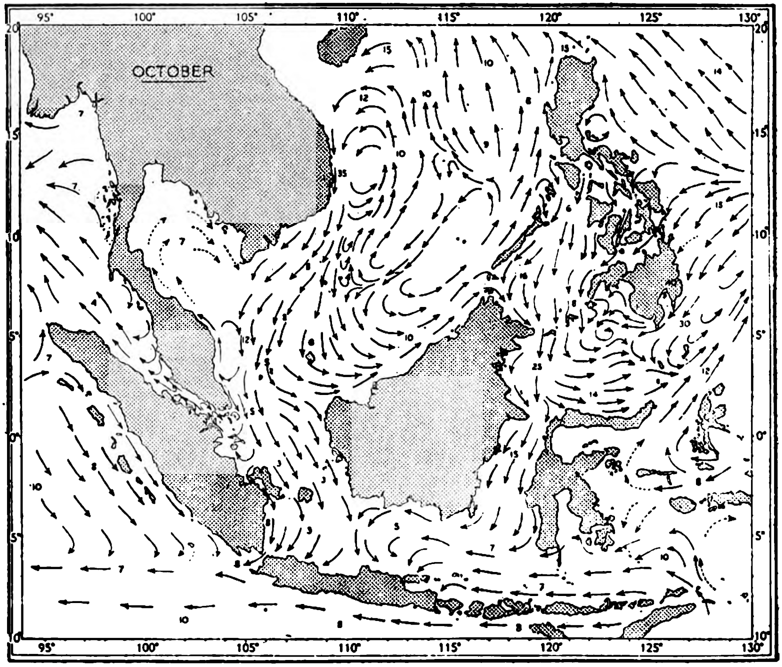
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Fig. 4

Celebes sea, the current along the north coast of Celebes is east-going.

Molucca and Banda seas.—In the northern part of Molucca sea and in the more northerly region between Sangi eilanden and Talaud eilanden, on the north-western side, and the northern part of Halmahera and Morotai, on the south-eastern side, during the southerly monsoon, from June to September, the current sets northward, running more strongly westward of Majoe and Tifore, towards the coast of Celebes, than eastward of them. During the northerly monsoon from December to April, the current sets about south by east; this is also stronger westward of the islands, where it may exceed a rate of one knot.

The general circulation of the Molucca and Banda seas alternates with the monsoons, *see* Figures 1 and 3 on pages 7 and 8, respectively. The details of the circulation appear to vary to some extent in the different months of the same monsoon.

Timor sea.—The currents of this sea are not well-known. In the northern part, between the parallels of 10° and 12° S, there is usually a predominance of sets between north-west and south-west, forming part of the course of the Equatorial current in the eastern part of the Indian ocean.

TIDAL STREAMS.—In open waters the tidal streams are generally weak, and merely strengthen or reduce currents due to the monsoon winds; in contracted passages, such as in the straits between the islands eastward of Java, they are, however, of considerable importance, and may attain a rate of fully 9 knots. Further details will be found in the appropriate places in the body of this work.

GENERAL SYSTEM OF BUOYAGE.—The general system of buoyage in Oost-Indische Archipel is as follows:—

The term starboard hand means that side which would be on the right hand for a vessel entering a harbour, river, or estuary, from seaward, or going in the main direction of the flood stream; the term port hand means the left hand side, under the same circumstances.

On the starboard side of a channel are:

(*a*) White light-buoys, exhibiting a *white* or a *green* light.
(*b*) White lantern-buoys (flat with a pyramidal structure), exhibiting a *green* light.
(*c*) White conical buoys.
(*d*) Iron beacons surmounted by a white ball.

On the port hand of a channel are:

(*a*) Black light-buoys, exhibiting a *white* or a *red* light.
(*b*) Black lantern-buoys, exhibiting a *red* light.
(*c*) Black can buoys.
(*d*) Iron beacons surmounted by a black truncated cone.

Buoys marking the approach to harbours and channels, etc., termed "verkenningstonnen," are painted red and black in horizontal bands, and are either light-buoys, exhibiting a *white* light, or conical buoys with a ball topmark of the same colour as the buoy.

Light-buoys, painted black and white in horizontal bands, exhibiting a *white* light, and conical buoys, painted black and white in horizontal bands, with a ball topmark of the same colour, give the position where a channel divides, the junction of two channels, or the beginning or end of a shoal lying in mid-channel. These can also be indicated by iron beacons, surmounted by a white ball either above or below a black truncated cone.

Black and white chequered light-buoys, exhibiting a *white* or a *red* light, and black and white chequered conical buoys, surmounted by a ball of the same colour, indicate a detached danger or a measured mile.

Beacons marking a detached danger are provided with one or two white balls, or one or two black truncated cones, according to which is most plainly visible.

Wrecks are marked by green conical buoys or green can buoys, according to whether the wreck lies on the starboard or port hand of the fairway; should the wreck lie in mid-channel it will be marked by a conical buoy on the starboard side of the channel, and a can buoy on the port hand of the channel.

Telegraph buoys and buoys marking a firing ground are red conical buoys, with or without a ball topmark, or buoys of various structure; whenever the buoys denote the starboard or port hand of a channel, the usual white conical and black can buoys serve as telegraph buoys.

Whenever it is necessary for a light-buoy, buoy, or beacon to be distinguished from others of a similar kind lying in the vicinity, the following special marking is used:—

(*a*) Instead of red and black or black and white horizontal bands, vertical stripes are used.

(*b*) Instead of black and white chequers, the buoys are painted in red and black chequers.

(*c*) If the buoy is a white conical buoy, it is provided with a white ball topmark; if it is a black can buoy it is provided with a black truncated cone.

(*d*) Above the single topmark of a beacon a second topmark of the same colour and shape is placed.

The light of a light-buoy is *occulting* or *flashing*, that of a lantern buoy is *fixed*. Instead of a *white* light a *green* or *red* light may be used, depending on the local circumstances (the distance the light must be seen, or the chance of confusing it with fishing lights, &c.).

In some places unofficial buoys and beacons of various shape and colour are found, but no reliance should be placed on these.

COMMUNICATIONS.—Railways.—There is a government railway in Java, also several privately-owned railways and tramways, all towns being accessible by rail; the total mileage, in 1940, was 3,378. Motor buses are run in conjunction with the railways and tramways.

For the railways in Sumatra, *see* Malacca Strait Pilot.

The other islands in Oost-Indische Archipel contain no railways, with the exception of a short line in Celebes, from Makasser to Tekalar.

Steam vessels.—There is regular communication between Europe and Singapore, and Batavia. The Koninklijke Paketvaart Maatschappij maintains regular service to all parts of Oost-Indische Archipel, thus connecting them with the main ports, from which there are steamship services to most countries; further details are given in the descriptions of each port or anchorage.

Air service.—Air services are maintained between Batavia and the more important towns in Java and Sumatra. There is a regular airmail service between Holland and Java, and between Singapore, Medan, and Batavia; there is also a regular air service between Java and Australia.

Radio stations.—The following coastal Radio stations are open for general public correspondence in the area covered by this volume:—

Christmas island; Batavia and Surabaya (Soerabaja in List), in

Java; Balik Papan in Borneo; Makasser and Menado in Celebes.

For details of the above stations, *see* list published by the Bureau of the International Telecommunication.

For details of radio stations which transmit weather bulletins, storm signals, navigational warnings, time signals, &c., *see* the Admiralty List of Radio Signals.

SHIPPING.—In 1940, 9,836 steam vessels, with an aggregate of 10,156,516 registered tons, entered the ports in Oost-Indische Archipel.

FUEL.—Coal can be obtained at the following places included in this volume:—Tandjoeng Priok haven, Surabaya and Tjilatjap (Chilachap), in Java; Bandjermasin, Samarinda and Tandjoeng Redeb, in Borneo; Makasser, in Celebes.

Fuel oil is obtainable at:—Tandjoeng Priok haven, Surabaya, Balik Papan, Samarinda, Tarakan and Makasser.

Further details are given with the description of the above places in the body of this volume.

DOCKYARD.—The Netherlands Government dockyard and Naval establishments are at Surabaya. There are also private docks at Tandjoeng Priok haven and Surabaya.

STANDARD TIME.—All information regarding Standard times and Summer times will be found in the Admiralty List of Radio Signals, Vol. II.

CONSULS.—British Consular officers are stationed at Batavia and Surabaya.

PILOTAGE.—Pilotage is compulsory for merchant vessels for all the ports in Oost-Indische Archipel, at which pilots are available.

Pilotage signals for the various harbours and coasts in Oost-Indische Archipel, which apply also to light-vessels equipped to show signals connected with the pilot service, are given below. The term " by day " indicates between sunrise and sunset, and " at night " indicates the remainder of the 24 hours.

I. **Pilot signals.**—The following signals are to be made by vessels entering and requiring a pilot:—

By day:—(*a*) The National flag, surrounded by a white border displayed at the foremast head.

or (*b*) The pilot signal P.T. of the International Code of Signals.

or (*c*) Flag G of the International Code of Signals.

or (*d*) The distant signal, consisting of a cone, point up, having above it two balls or shapes resembling balls.

At night:—(*a*) A *blue* light every fifteen minutes.

(*b*) A bright *white* light, flashed or shown at short intervals, just above the bulwarks, for about one minute at a time.

(*c*) The signal P.T. in the Morse code made by flashing lamp.

The above signals must be shown until the pilot is on board, or until an answering signal has been made.

Vessels arriving at night, but not wishing to enter at night, shall show the pilot signal at daybreak.

Vessels bound for Tandjoeng Priok haven or Makasser are recommended to show the Company flag, which in this case is considered as a request for a pilot to be provided at daybreak.

At Surabaya, the following signals can be displayed on board :—

Pilot service flag, or first pendant and R flag . . .	I need a harbour pilot for berthing at the quay.
Pilot service flag, or first pendant and DO flags . . .	I am steaming through.

The Pilot service flag is blue with a white star in its centre.

II. **Answering signals by pilot light-vessels.**—The following answering signals are given by pilot light-vessels to entering vessels giving the pilot signal :—

Day signal.	*Night signal.*	*Signification.*
Nil . . .	White flare or swinging a *white* light.	The pilot will proceed to the vessel at once.
Flag D of the International Code.	A *red* light above a *white* light.	No pilot is available on board the pilot light-vessel; the vessel may enter without a pilot until one is met with.
Nil . . .	A *green* light above a *white* light. (This signal is only made by the pilot light-vessel for the West channel, Surabaya, and that for Belawan-Deli.)	As a pilot motor boat is not available, the vessel will be served by a rowing boat.
A cone, point up, with a ball below it.	A *white* light above a *red* light. (This signal is only made by the pilot light-vessel at Belawan-Deli.)	No pilot is available on board the pilot light-vessel; the vessel must wait outside until further notice.
Two cones, vertically disposed, points down.	Two *green* lights, vertically disposed. (This signal is only made by the pilot light-vessel for the Western channel, Surabaya.)	No pilot is available for vessels of less than 1,000 cubic metres capacity; these vessels may enter without a pilot.

III. **Answering signals by look-out stations.**—The following answering signals are made by look-out stations at Tandjoeng Priok haven, Tjilatjap, and Makasser (night signals are not made at Tjilatjap) :—

Day signal.	*Night signal.*	*Signification.*
A black cylinder .	A rocket . . .	The vessel has been observed.
The Company or the National flag, or the name signal of the vessel.	A *red* light . .	The pilot is proceeding to the vessel.
A ball, with two cones, points up, vertically disposed, below it.	Three lights, vertically disposed, the upper one *red* and the other two *white*.	The vessel cannot be attended to at once, or for other reasons must wait outside until further notice.
Two cones, vertically disposed, bases together.	A *white* light above a *green* light.	There is no pilot available; the vessel may enter without a pilot.
A ball with a cone below it, point up.	A *red* light above a *white* light.	The pilot will not board the vessel outside; the vessel may enter without a pilot until one is met with.

IV. **Special communication signals.**—The following signals are shown at the places given below :—

Tjilatjap.—When applicable, the following signal will be displayed from the look-out station, denoting that the vessel cannot enter on that day:—

A black ball between two cones, points up, vertically disposed.

Sungei Martapoera.—Shown at the signal mast on the southern side of the entrance for in-coming vessels, and from the flagstaff near the Harbour office at Bandjermasin for out-going vessels.

Day signal.	*Night signal.*	*Signification.*
A red ball.	A *red* light.	Passage prohibited.
A white triangle	A *white* light.	Passage permitted.
A red ball below a white triangle.		The vessel lying alongside the Commercial pier may proceed; passage for other vessels is prohibited.

In 1947, navigation signals at Bandjermasin were displayed by means of white signal marks.

SIGNALS.—Light-vessels out of station.—In Oost-Indische Archipel, when a light-vessel is driven from her proper position the following signals will be made:—The usual light will not be exhibited, but a *red fixed* light will be exhibited at each end of the vessel, and a *red* and a *white* flare will be shown simultaneously at least every quarter of an hour; if the use of flares is impracticable a *red* light and a *white* light will be shown simultaneously. By day, the distinguishing daymark will be struck if practicable, a black ball will be shown at each end of the light-vessel, and the International Code signal PC will be displayed.

A light-vessel under way will show the same lights and make the same sound signals as laid down for other vessels; when moving under her own power by day she will display a black ball at each end and will strike her daymark.

Special signals in the harbours of Oost-Indische Archipel.—The following signals may be used in the harbours of Oost-Indische Archipel, in addition to those of the International Code of Signals.

Displayed on shore:—

Third pendant and A flag .	Your berth is Pier I
„ „ „ B „ .	„ „ „ II
„ „ „ C „ .	„ „ „ III
„ „ „ D „ .	„ „ „ IV
„ „ „ E „ .	„ „ „ V
„ „ „ F „ .	„ „ „ VI
„ „ „ G „ .	„ „ „ VII
„ „ „ R „ .	You must anchor in the road.
Blue flag	No communication owing to bad weather.

Displayed on board:—

Third pendant and H flag .	I need dock assistance.
Second „ „ M „ .	Please send a motor boat.
Third „ „ J „ .	Water signal.
First „ „ N „ .	I have passengers from outside Oost-Indische Archipel who wish to disembark.
Second „ „ V „ .	I want an ash boat.

within twenty-four hours after his return to or next putting into port, make a declaration to the proper authorities.

The latter shall communicate the information to the Consular authorities of the country to which the owner of the cable belongs.

Caution.—Cautionary notes appear on many charts, calling attention to areas in which there are submarine telegraph cables ; these areas are indicated by pecked lines on the charts.

Every care should be taken to avoid anchoring in such areas, even though there may be no specific prohibition against so doing, in view of the serious interference with communications which results from damage to submarine cables. Equal care should be taken whenever the symbol for a submarine cable (a wavy line) is shown on the chart.

Danger involved in cutting a submarine cable to clear anchors or fishing gear.—In the event of any vessel fouling a submarine cable, every effort should be made to clear the anchor or gear by normal methods ; should these efforts fail, the anchor or gear should be slipped and abandoned *without attempting to cut the cable. High voltages are, or may be, fed into certain submarine cables ; serious risk exists of loss of life due to electric shock, or at least of severe burns if any attempt to cut the cable is made.* No claim in respect of injury or damage sustained through such interference with a submarine cable will be entertained.

Compensation for anchors or fishing gear sacrificed in order to avoid injuring a submarine cable can be claimed under the Submarine Telegraph Act of 1885 (Schedule of Submarine Telegraph Convention, Article VII).

NETHERLANDS SUBMARINES.—Netherlands vessels, which are carrying out exercises with submarines, or are escorting submerged submarines, display a red flag at the masthead.

All vessels must give a vessel, which is displaying a red flag at the masthead, a wide berth.

A vessel, which, for some reason, finds it necessary to approach the vessel displaying a red flag, must proceed at slow speed until the latter vessel has indicated the danger zone by means of flags, or other signals, or megaphone.

In every case, in these circumstances, a good look out must be kept for submarines, which may have only the periscope above water.

REGULATIONS.—Zeegats and harbours in Oost-Indische Archipel.—Manœuvres or other causes may necessitate the closing of the various zeegats and harbours, or may make the entry thereto subject to special reservations.

In normal cases the following signals will be shown from a flagstaff in the harbour area and/or from a look-out station, or may be shown from the pilot light-vessels :—

Day signal.	*Night signal.*	*Signification.*
A black cone, point up, between two black balls.	A *white* light between two *red* lights.	Entering prohibited.
A black ball below two black cones, points together.	A *white* light, with a *green* light above it and a *red* light below it.	Entering and leaving prohibited.
A black cone, point down, below two black cones, points together.	A *white* light between two *green* lights.	Leaving prohibited.

All the above shapes and lights are disposed vertically.

In exceptional circumstances, three *red* balls or three *red* lights, disposed vertically, denotes that vessels are absolutely prohibited from entering, except in most urgent cases. When this signal is seen by a vessel approaching she must proceed—wind and sea permitting—to the examination vessel, which carries the same signal, stationed at the entrance to the zeegat.

Permission or refusal to enter will be given after examination. A vessel is then only allowed to enter provided she is in charge of a pilot, or is preceded by a warship or a pilot vessel; from the moment the signals are shown all exemptions from taking a pilot cease. Captains and masters of vessels are to carry out the instructions of the officer who has come on board from the examination vessels and are to obey all signals.

If a warning shot is fired, the engines of all vessels in the vicinity of the examination vessel must be stopped immediately, insofar as safety permits. Failure to comply with these regulations may result in danger to the vessel and crew. As a general rule permission to enter at night will not be granted.

If a signal is made from the shore to intimate that vessels are subject to examination, and if there is no examination vessel in the entrance to the zeegat, vessels must anchor or lie off.

The coming into operation of these regulations at any particular zeegat or harbour will not be announced beforehand.

During firing and bombing practices by aircraft of the Netherlands Royal Navy, the target-towing vessel will display flag B of the International Code of Signals.

DERATISATION.—In accordance with Article 28 of the International Sanitary Convention of 21st June, 1926, Deratisation can be carried out, and Deratisation and Deratisation Exemption certificates can be issued at the more important ports in Oost-Indische Archipel.

Charts 941a, 941b, 942a.

PASSAGES.—For Ocean Passages to and from the Eastern Archipelago the mariner is referred to the Admiralty publication "Ocean Passages for the World." Directions for the various straits and passages leading into the Java and Flores seas are given in the body of this work; a brief account of through tracks in the area embraced in this work is given below.

Sunda strait to Straat Wètar.—From the northern end of Sunda strait (page 66) through one of the channels forming the western approach to Tandjoeng Priok haven (page 82), along the north coast of Java and Madoera, through Straat Sapoedi (page 139), southward of Kangean eilanden, southward of Zandbuis and Maria Reigersbergen banken, and thence along the parallel of 8° S. to Straat Wètar.

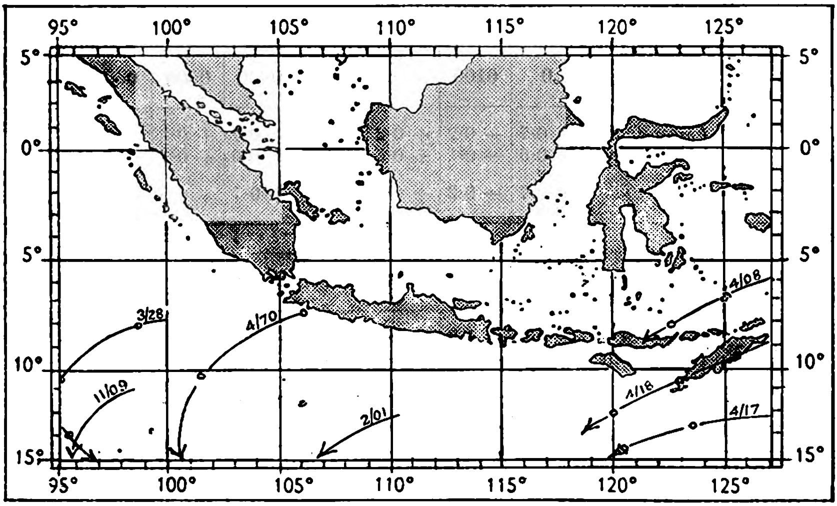
Straat Karimata to Straat Wètar.—From Straat Karimata (Carimata) (*see* Eastern Archipelago Pilot, Vol. IV) vessels bound for Straat Wètar frequently pass southward of Bawean when in that vicinity at night, and thence through Straat Sapoedi; by day the route can be shortened considerably by passing northward of Bawean and then steering for the south-western extremity of Kangean, thence steering a south-easterly course to the parallel of 8° S.

Straat Karimata to Macassar strait.—From the south-eastern end of Straat Karimata direct to Tanjong Selatan, near the south-eastern extremity of Borneo, through Straat Laoet (Laut) (page 383), or southward of and up the east coast of Pulau Laoet (Laut), and thence westward of Kleine Paternoster eilanden (page 395). If proceeding to Makasser vessels can pass southward of Pulau Laoet, northward of Laurel riffen (page 388), and thence through the swept channel to Makasser (page 427).

Straat Karimata to Molucca sea.—From the south-eastern end of Straat Karimata to a position southward of Bawean, southward of De Bril bank, in the southern approach to Makasser, through Straat Saleier (Salayar) (page 484), and through Passage van Boeton (Buton passage) (page 525), into the Molucca sea.

CLIMATE AND WEATHER.—General remarks.—Articles 1, 2, 3, and 4 in General Meteorology section of the preliminary pages are appropriate to this pilot. In the area covered by this pilot the climate is hot and damp, air temperature averaging about 80° in all seasons and sea temperature 80°–84°. The heat is alleviated to some extent by seasonal or local winds and especially by the South-east trade wind, which blows from about April to October south of latitude 5° S., and throughout the year around the Cocos islands. In regions where this wind alternates with the North-west monsoon, it is sometimes known as the South-east or East monsoon. The other seasonal wind is the westerly, north-westerly or northerly monsoon, from about December to March. Calms very rarely last for more than a few hours, and this is equally true of the violent squalls (usually associated with thunderstorms) that sometimes interrupt long periods of quiet weather, especially from October to April.

One or two tropical revolving storms occur in some years within an area which includes the Flores sea, the seas around Timor, and that part of the Indian ocean included in this Pilot (for typical tracks, *see* figure below). They may appear at any time between September and May, December to March being the most likely months, but the frequency of destructive storms does not exceed one in about ten years at any particular point.



Some tracks of cyclones.

The annual rainfall is generally from two to five times that of Greenwich. There is a relatively dry season with the trade wind. Large seasonal differences of rainfall between places not many miles apart are common, and are nearly always due to differences in the amount of shelter afforded by mountains from the principal rain-bearing winds for that season.

At sea visibility is normally good or very good, and fog almost unknown, but in the lower parts of large rivers and in marshy regions fogs occur. They generally form at night and clear by 0800.

Pressure.—An indication of the average distribution of pressure from December to February is given by the chart for January (Fig. 1) facing this page, and similarly an indication of the distribution for June to September by the chart for July (Fig. 2) facing page 19. In other months the average is 1008–1011 mb. for the whole region. The seasonal variation is nowhere more than a few millibars.

Although day-to-day variations are generally small there is a fairly regular diurnal oscillation of the kind characteristic of the tropics, which has a range of about 3 mb. Pressure is on an average highest at about 1000 and 2200, and lowest at about 0400 and 1600 local time.

In Figures 1 and 2 the arrows show the direction of the predominant wind, if its constancy is at least 51%, according to the following scheme:—

⇢, 51–60%   ⟶, 61–80%   ⟹, 81–100%

Predominance is judged in relation to that quadrant (90°), not necessarily bounded by the four cardinal points, which shows the greatest number of winds. Only winds of force 3 or more are taken into account, in estimating predominance. The arrow shows the direction bisecting the quadrant, and the constancy is defined as the percentage relation between the number of winds from that quadrant, of forces 3–12, and the total number of winds observed from all directions (including forces 0–2).

The table below gives for each hour the correction in millibars to be applied to the observed pressure to allow for the diurnal variation. Those for 0–10° S. can be used for the whole of the region south of the equator.

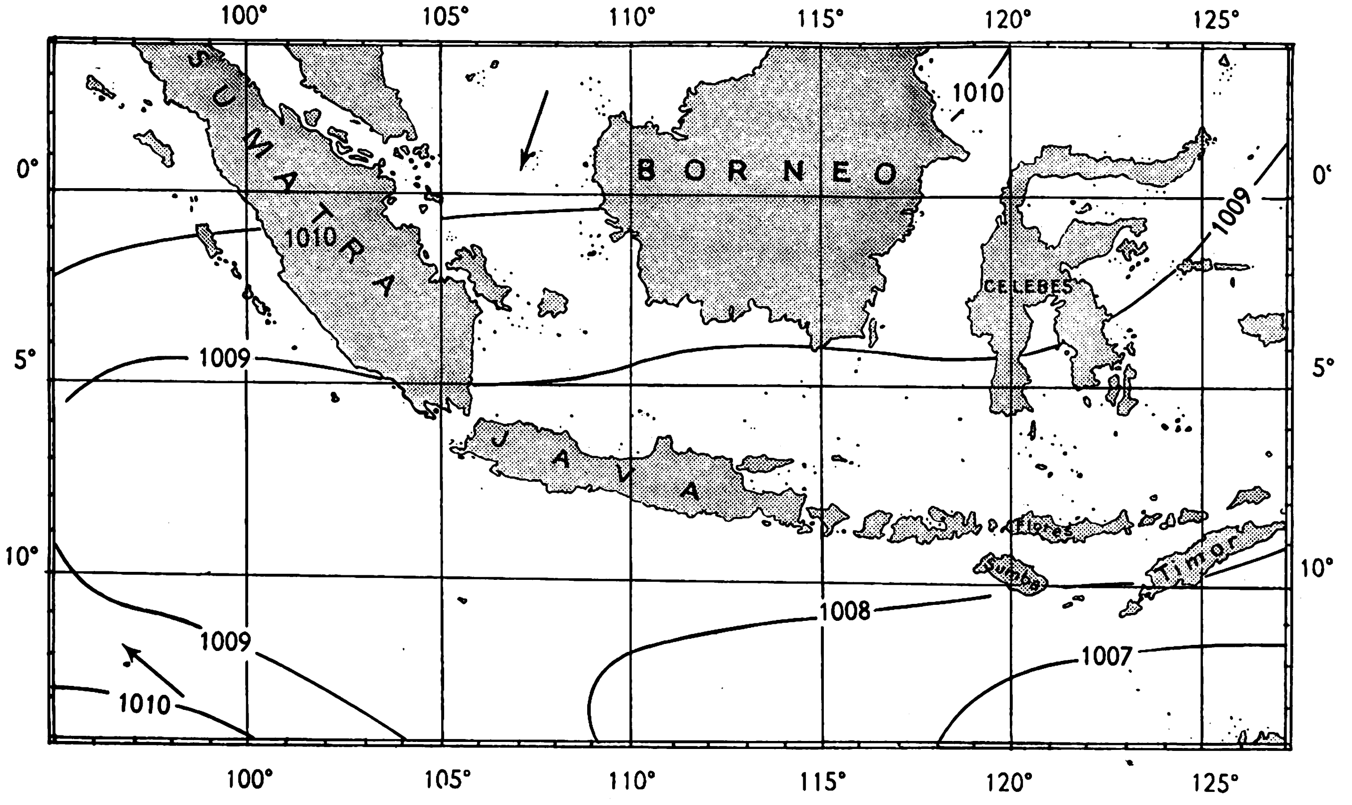
Local time		0	0100	0200	0300	0400	0500	0600	0700
0–10° N.	May–Oct.	− 0·7	− 0·2	+ 0·2	+ 0·6	+ 0·7	+ 0·5	+ 0·1	− 0·4
	Nov.–Apr.	− 0·6	− 0·1	+ 0·5	+ 0·8	+ 0·9	+ 0·7	+ 0·2	− 0·4
0–10° S.		− 0·7	− 0·2	+ 0·2	+ 0·6	+ 0·7	+ 0·5	+ 0·1	− 0·5

Local time		0800	0900	1000	1100	1200	1300	1400	1500
0–10° N.	May–Oct.	− 0·9	− 1·2	− 1·3	− 1·0	− 0·5	+ 0·2	+ 0·8	+ 1·3
	Nov.–Apr.	− 1·0	− 1·4	− 1·5	− 1·2	− 0·7	+ 0·1	+ 0·8	+ 1·4
0–10° S.		− 1·0	− 1·3	− 1·3	− 1·1	− 0·5	+ 0·2	+ 0·9	+ 1·4

Local time		1600	1700	1800	1900	2000	2100	2200	2300
0–10° N.	May–Oct.	+ 1·5	+ 1·4	+ 1·0	+ 0·4	− 0·2	− 0·7	− 1·0	− 0·9
	Nov.–Apr.	+ 1·6	+ 1·5	+ 1·0	+ 0·4	− 0·3	− 0·8	− 1·0	− 1·0
0–10° S.		+ 1·6	+ 1·5	+ 1·1	+ 0·5	− 0·1	− 0·7	− 0·9	− 0·9

JANUARY, MEAN PRESSURE

Fig. 1.



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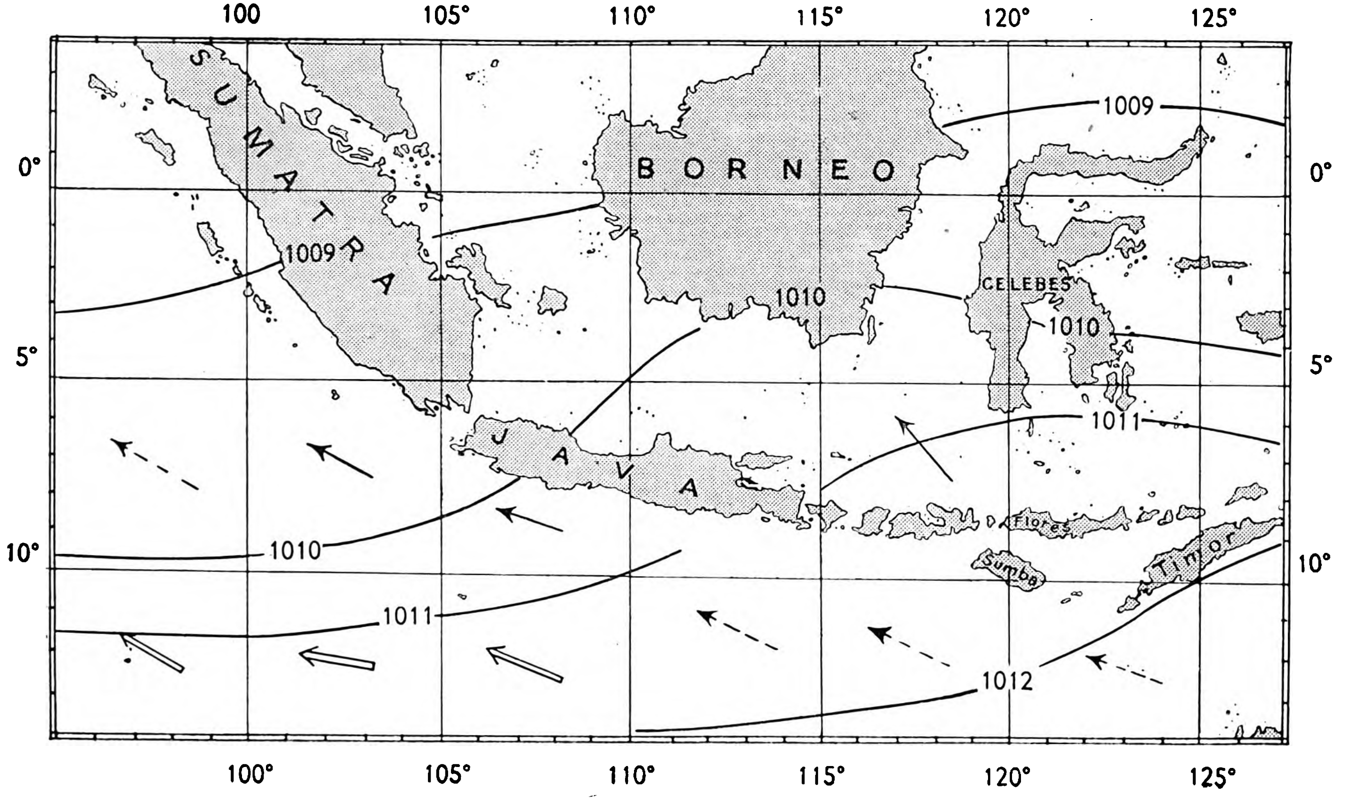
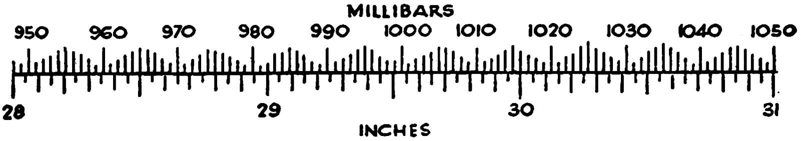
JULY, MEAN PRESSURE

Fig. 2.



The diagram below gives the equivalent, in millibars, of inches of mercury and *vice-versa.*



Percentage frequency of winds.—Figures 3 and 4 facing pages 20 and 21 show the percentage frequency of winds for January and July, respectively.

Sea surface temperatures.—Figures 5 and 6 facing pages 22 and 23 show the mean sea surface temperatures for February and August, respectively.

REGIONAL WEATHER.—**Sunda strait.**—*April to September.*—The South-east trade wind is not very steady except in August and September, and then only in the wider parts of the strait and more than 20 miles from land, where land and sea breezes are not prominent.

On the Java side at night the land breeze tends to reinforce the trade wind; on the Sumatra side it is the sea breezes in the afternoon that do this.

In the northern approach to the strait sea breezes from the Java sea often draw the wind into north-east in the daytime, especially on the Sumatra side.

Twenty miles or more from land the wind is light to moderate on 20–30 days a month. It may reach force 6 on three or four days a month in August and September.

Visibility is mainly good, but may be less than 5 miles on two or three days a month between July and September.

The average monthly rainfall is between 3 and 5 inches (twice that of Greenwich) but droughts of several weeks' duration occur in dry years. When the South-east monsoon is late or less steady than usual, rainfall is usually above the average.

The number of days per month of appreciable rain (0·04 inches or more) is about 5–15, nearly half of them days of considerable rain (0·40 inches or more).

Most of the rain falls in thunderstorms.

October to mid-December.—South-easterly winds tend more and more to be replaced by south-south-westerly or south-westerly winds during October, and from mid-November to mid-December south-westerly to westerly winds predominate.

These winds are mostly light or moderate, but at rare intervals (less than once a month) reach force 8 or 9 in squalls.

Land and sea breezes are prominent near the coast.

Visibility is mainly good, but may be less than 5 miles on three or four days a month.

The average monthly rainfall is between 4 and 8 inches (two to three times that of Greenwich), but is less than an inch in dry years.

Days of appreciable rain (0·04 inches or more) average 5–15 per month, nearly half of them days of considerable rain (0·40 inches or more.) Most of the rain falls in thunderstorms.

Mid-December to March.—The westerly monsoon is fairly steady 20 miles or more from the coast, with light to moderate winds from between south-west and west-north-west on two days out of three.

At rare intervals (less than once a month) there are squalls of force

8 or 9, mainly from some westerly point (more often north-westerly or northerly in February).

Land and sea breezes are prominent except during the wettest periods.

Visibility is normally very good except during heavy rainstorms.

Java, Madoera, and islands eastward of Java.—*April to September.*—The average monthly rainfall is between 8 and 18 inches (5 to 10 times that of Greenwich).

The number of days per month of appreciable rain (0·04 inches or more) is about 10–25, nearly half of them days of considerable rain (0·40 inches or more).

Most of the rain falls in thunderstorms lasting for a few hours, but longer rainy periods occur from time to time.

Twenty miles or more from the coast the South-east trade wind (or east monsoon) blows fairly steadily, except in April, when it is not yet firmly established. It is nearly always light to moderate (between 25 and 30 days a month) except southward of Java (15–25 days a month). There is a gale about once a month in July and August.

Between April and May a cyclone may once every few years move west-south-westward across the islands eastward of 120° E. and cause destructive winds over parts of the Flores sea, as well as in the Kleine Soenda eilanden and over the ocean southward of those islands.

Land and sea breezes are prominent when the trade wind is weak.

Visibility is mainly good, but is less than 5 miles on three or four days a month between July and September. Fog sometimes develops at night on the coast, but nearly always clears by 0800.

Southward of Java the average monthly rainfall is 3 to 5 inches (twice that of Greenwich) and over the rest of the region 1 to 3 inches (about that of Greenwich) but there are years when large areas have very little rain at this season. When the South-east monsoon is late, or less steady than usual, rainfall is usually above the average. The number of days per month of appreciable rain (0·04 inches or more) is 1–10, nearly half of them days of considerable rain (0·40 inches or more). Most of the rain falls in thunderstorms.

October to mid-December.—Winds from south-east and east are rather frequent in October. In November wind is very variable, but early in December winds from west and west-north-west begin to become more common.

Throughout the period light to moderate winds occur on 20 to 28 days a month, the few stronger winds being nearly always south-easterly in October and westerly in December. There are occasional squalls (less than once a month) of force 8 or 9, mainly from some westerly point after October.

At average intervals of ten or more years a cyclone may pass west-south-westward between Timor and Australia in December, and cause a south-westerly or westerly gale south-eastward of Timor.

Land and sea breezes are prominent near the coast.

Visibility is mainly good, but is less than 5 miles on three or four days a month. Fog sometimes develops at night on the coast, but nearly always clears by 0800.

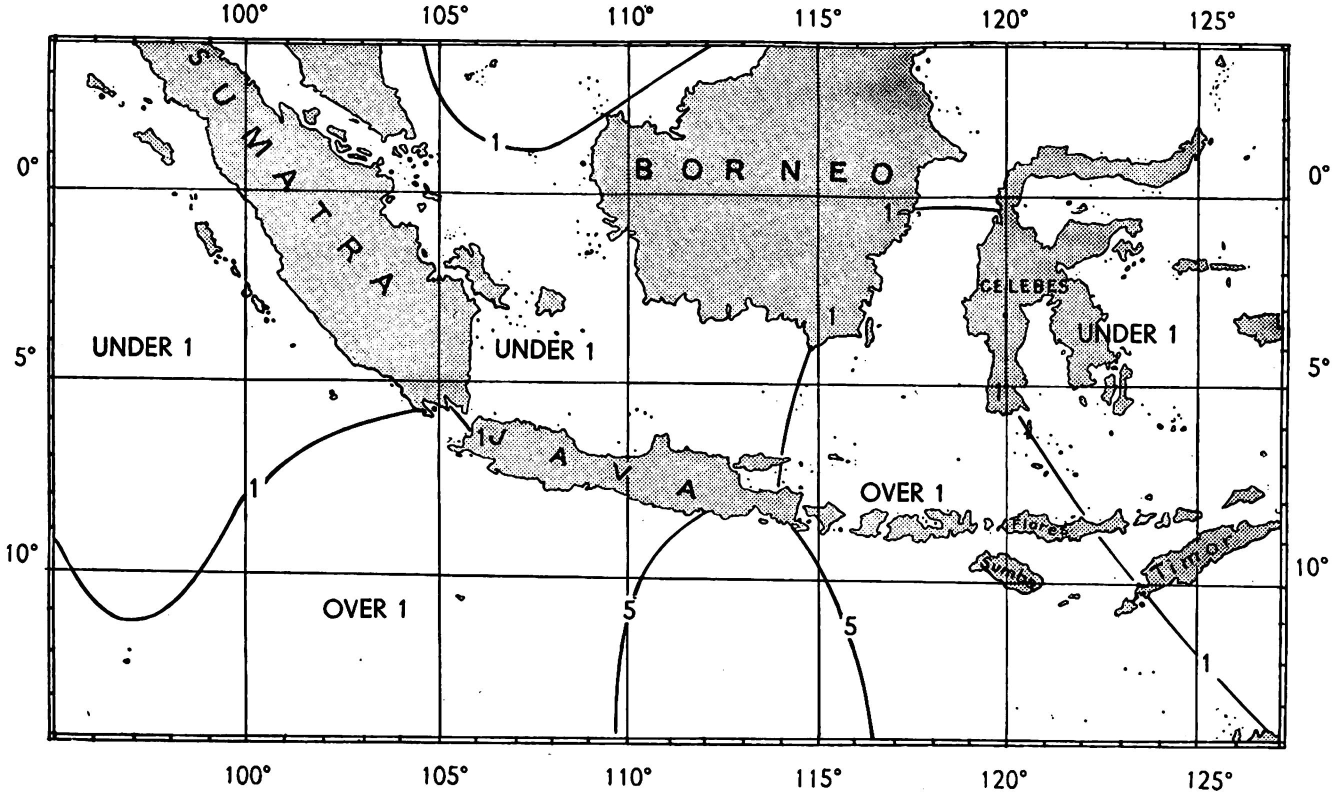
The average monthly rainfall is 4 to 8 inches (2 or 3 times that of Greenwich) and the number of days per month of appreciable rain (0·04 inches or more) is 4–20, nearly half of them days of considerable rain (0·40 inches or more). Most of the rain falls in thunderstorms.

Mid-December to March.—The westerly monsoon is fairly steady 20 miles or more from the coast, with light to moderate winds on 20 to

To face page 20.

Fig. 3.

JANUARY PERCENTAGE FREQUENCY OF WIND, FORCES 7–12



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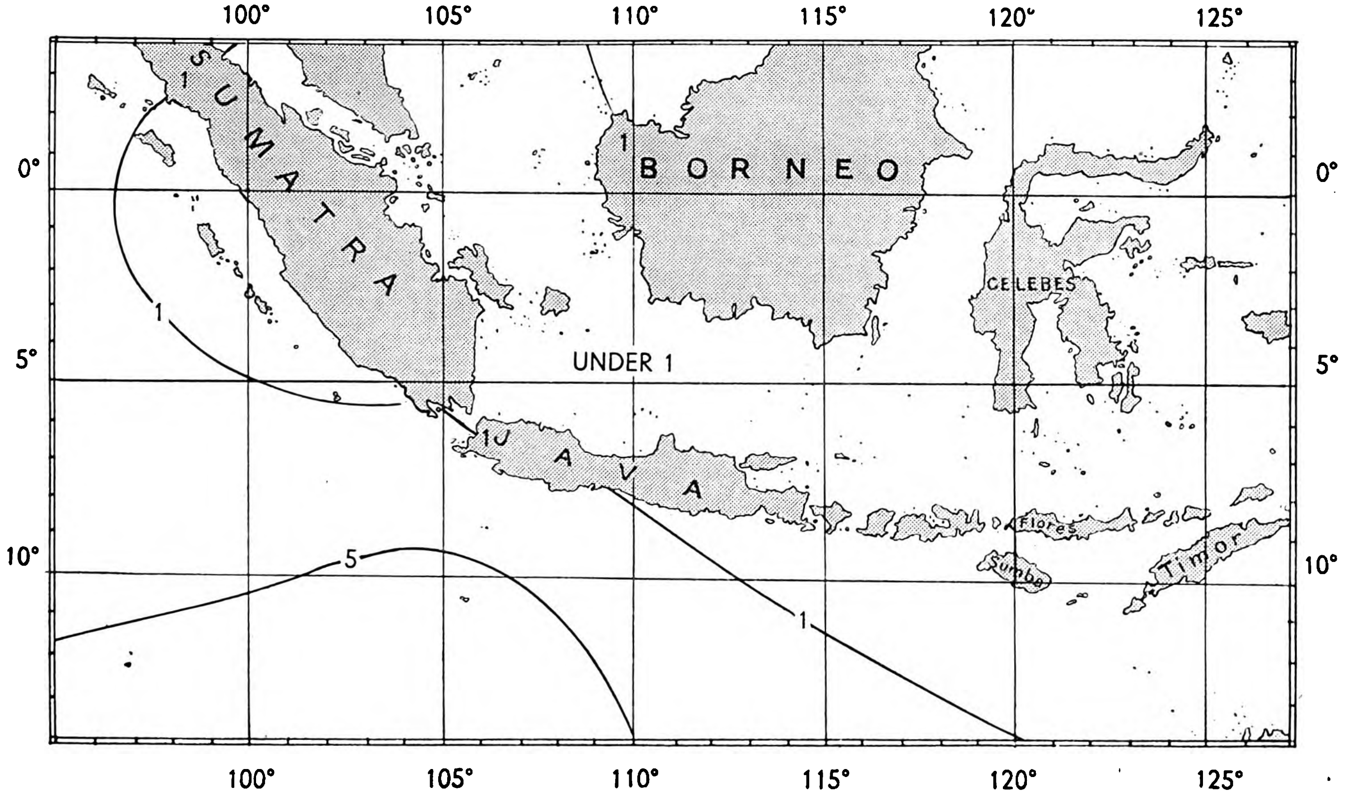
JULY PERCENTAGE FREQUENCY OF WIND, FORCES 7–12

Fig. 4.



25 days a month. At rare intervals (less than once a month) there are squalls of force 8 or 9, mainly from some westerly point.

At intervals of several years, a cyclone may pass west-south-westward between Timor and Australia and cause a south-westerly gale south-eastward of Timor. More rarely in March a cyclone may move west-south-westward across the islands eastward of 120° E. and cause destructive winds in parts of the Flores sea, in the Kleine Soenda eilanden and over the ocean southward of these islands.

Land and sea breezes are prominent near the coast.

Visibility is normally very good except during heavy rainstorms.

The average monthly rainfall is between 8 and 15 inches (5 to 8 times that of Greenwich). The number of days per month of appreciable rain (0·04 inches or more) is 15–25, nearly half of them days of considerable rain (0·40 inches or more). Most of the rain falls in thunderstorms, lasting for a few hours, but longer rainy periods occur from time to time.

Southern and eastern coasts of Borneo, Macassar strait, and Celebes.—*April to October.*—Twenty miles or more from land winds are southerly or south-easterly more often than not; they are light on 15 to 25 days a month and moderate on 3 to 6 days. Force 5 or 6 occurs less than once a month, mostly in squalls associated with thunderstorms.

Land and sea breezes are prominent near the coast and it is rarely calm for more than a few hours on end.

Visibility is mainly good apart from rain, but from July to November is less than 5 miles two or three times a month. Fog sometimes develops at night on the coast, but nearly always clears by 0800.

The average monthly rainfall is between 4 and 10 inches (2 to 5 times that of Greenwich) and the number of days per month with appreciable rain (0·04 inches or more) is 4–12, half of them days of considerable rain (0·40 inches or more). Much of the rain falls in thunderstorms.

November to March.—Twenty miles or more from land the wind is mainly south-westerly to north-westerly until after December, when northerly or north-easterly winds become more common. It is light to moderate on 25–30 days a month, with squalls of force 5 or 6 less than once a month.

Land and sea breezes are prominent near the coast, and it is rarely calm for more than a few hours on end.

Visibility is normally good or very good apart from rain. Fog sometimes develops at night on the coast, but nearly always clears by 0800.

The average monthly rainfall is between 6 and 20 inches (3 to 10 times that of Greenwich) and the number of days per month with appreciable rain (0·04 inches or more) is 10–20, half of them days of considerable rain (0·40 inches or more). Much of the rain falls in thunderstorms.

Cocos or Keeling islands.—*April to December.*—There is very seldom any wind other than the trade wind, blowing from south-easterly and easterly directions.

The wind is fresh or strong on 15–20 days a month from June to October, and on 10–15 days during the rest of the period. From July to September it reaches a steady gale about once a month, and brief squalls of gale force are not uncommon. Calms are very rare.

Except in July and August there is the possibility of a destructive cyclone, the chance being greatest in December (one in about 40 years). Normal tracks of such storms are shown in the Figure on page 17.

When the centre of the cyclone of November 27th, 1909, crossed the group the barometer fell to 945 mb. and in six hours the wind and waves levelled all villages and left practically nothing standing.

Visibility is generally good or very good apart from rain. It is under 5 miles about once a month from July to December. Fog is practically unknown.

From April to July the average monthly rainfall is about 9 inches (nearly 5 times that of Greenwich) and the number of days per month of appreciable rain (0·04 inches or more) is about 20, nearly half of them days of considerable rain (0·40 inches or more).

From August to December the average monthly rainfall is about 4 inches (twice that of Greenwich) and the number of days per month of appreciable rain (0·04 inches or more) is about 14, nearly half of them days of considerable rain (0·40 inches or more).

Much of the rain falls in heavy showers or thunderstorms. Rainy weather has been reported to last for several days when the wind shifts to southward of south-east, a return of the wind to south-east then indicating that the weather will clear. These changes are most frequent in June and July.

January to March.—The trade wind is least steady in these months, yet the wind is south-easterly or easterly 2 days out of 3. It is light to moderate on about 25 days a month.

Gales are extremely rare apart from short squalls, which blow mainly from between west and north.

A destructive cyclone occurs on an average about once in 10 years (normal tracks of such storms are shown in the Figure on page 17).

Visibility is normally very good apart from rain. It is under 5 miles less than once a month. Fog is practically unknown.

The average monthly rainfall is about 7 inches (over 4 times that of Greenwich) and the number of days per month of appreciable rain (0·04 inches or more) is about 17, nearly half of them days of considerable rain (0·40 inches or more). Much of the rain falls in heavy showers or thunderstorms.

Christmas island.—On the island the wind is much influenced by topographical effects (*see* under "Local Weather," page 1) and for this reason the figures given in the Climatic table (page 25) are not representative of winds in coastal waters or out at sea.

Ten miles or more from land the winds are as follows:—

January to March.—Mainly westerly, and light to moderate, but strong in squalls (one or two squalls of force 7 to 9 in a month). Squalls are generally from a north-westerly or northerly direction. They raise an unpleasant sea and often make landing impracticable.

April to December.—Mainly south-easterly to easterly, light to moderate on 20 to 30 days in a month, fresh to strong on 2 to 5 days. There are generally one or two moderate gales in a month from July to September.

No severe cyclone has crossed the island since it was settled in 1888, but the possibility of one doing so, between September and May, cannot be entirely set aside.

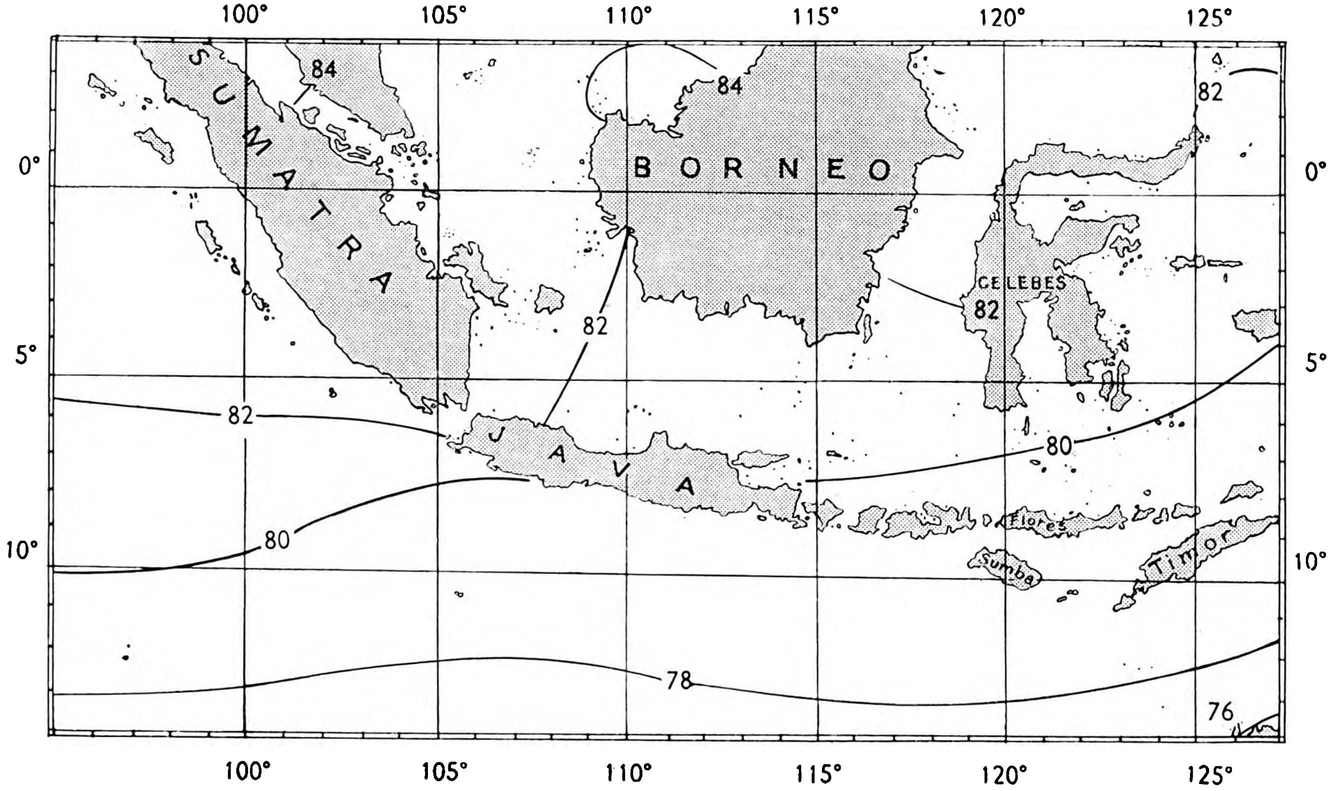
The climate is very warm and damp. (*See* Climatic table on page 25.)

The annual rainfall averages 80 inches (more than 3 times that of Greenwich) and the monthly falls vary from 11 inches in February and March to 2 inches from August to October. The number of days per month with appreciable rain (0·04 inches or more) is about 15 from February to May and 5 from August to November. About half of these are days of considerable rain (0·40 inches or more).

To face page 23.

AUGUST, MEAN SEA SURFACE TEMPERATURE

Fig. 6.



Most of the rain falls in heavy showers, and there are occasional thunderstorms between November and April.

Visibility is normally very good, except during heavy rain, from December to March, but is less than 5 miles two or three times a month from July to November. Fog is almost unknown.

CLIMATIC TABLES.—The tables that follow give statistics for several land stations at which there is a regularly reporting weather station. The figures given are averages, percentage frequencies, or extremes, as stated; it must be realised that these values refer to the actual positions in which the weather has been observed and *not* necessarily to the open sea or to the approaches to ports in the vicinity. The tables for land stations should therefore be consulted with discretion, especially as regards wind, visibility, cloud and rainfall, since all of these elements are probably affected, sometimes a great deal, by local conditions. The following notes indicate ways in which average conditions in the open sea may be different from those at the nearest reporting station for which a table is published:

(i) Temperatures over the sea are less extreme, or show smaller departures from the mean, than over the land. The air temperature over the sea is often higher than that at a land station during the night and early part of the day, and often lower than that at a land station during the afternoon.

(ii) Rainfall is generally not representative of conditions at sea within, say, 100 miles. If the coast has a mountainous background, and the prevailing wind is onshore, the rainfall generally becomes progressively less with increasing distance from the shore.

(iii) Cloud amount, which in this area is most variable, is only very broadly representative of the state of the sky over the sea. If the station is far from the open sea or the wind is offshore the amount is likely to be greatest in the afternoon and least during the latter part of the night, whereas in the open sea it tends to be greatest at night and least during the day.

(iv) Wind speed is very often greater over the sea than over the land, and there may be twice the number of gales at sea than are experienced at a shore station unless it is exceptionally well exposed on, for example, a headland or small low-lying island. Wind direction is affected as explained under " Local Weather " on page 1.

PLACE—COCOS ISLAND. LAT. 12° 05′ S., LONG. 96° 53′ E. Height above Mean Sea Level, 15 feet.

Climatic Table compiled from 5 to 36 Years' Observations, 1905 to 1942.

This table represents conditions at Flying Fish cove which is sheltered from the South-east trade winds.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount Scale 0—10	RAIN		WIND DIRECTION																		Mean wind speed		No. of days with gale §	No. of days with fog or mist
	‡ Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0900	1500	‡	Average fall	No. of days with 0·01 in. or more	0900 Percentage of observations from									1500 Percentage of observations from									0900	1500		
											N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm				
	mb.	° F.	° F.	° F.	° F.	%	%		in.																				knots			
January	1011	86	77	90	73	76	74	4·2	5·5	11	3	4	22	42	18	3	2	4	2	4	4	19	43	18	4	1	6	1	5	5	0·2	—
February	1010	87	77	90	73	79	77	5·0	7·6	14	6	2	20	37	17	10	2	3	3	6	4	22	31	18	8	4	7	0	5	6	0·2	—
March	1010	86	78	90	74	80	78	5·0	8·5	16	7	9	38	32	2	5	2	5	0	8	10	29	30	5	5	3	10	0	6	5	0·5	—
April	1011	85	78	88	74	82	80	4·8	10·1	18	1	5	40	45	7	1	1	0	0	1	4	37	49	7	2	0	1	1	7	7	0·5	—
May	1012	84	77	88	74	82	81	4·7	7·6	16	1	3	36	54	6	0	0	0	0	1	8	35	51	5	0	0	0	0	9	8	1	—
June	1012	83	76	86	73	83	81	5·1	9·3	18	0	1	38	57	4	0	0	0	0	0	3	35	57	4	0	0	1	0	10	9	1	—
July	1013	82	76	86	72	82	80	5·0	8·7	18	2	1	42	49	5	0	0	1	0	1	2	40	52	5	0	0	0	0	10	10	1	—
August	1013	83	75	86	72	80	78	4·7	4·8	16	1	3	51	42	3	0	0	0	0	1	3	51	39	4	1	0	1	0	9	9	0·5	—
September	1014	83	75	86	72	78	75	4·5	3·5	13	1	1	52	45	1	0	0	0	0	1	4	46	46	3	0	0	0	0	9	10	0·3	—
October	1014	84	76	87	72	77	76	4·5	3·5	11	1	3	46	47	3	0	0	0	0	0	3	42	52	3	0	0	0	0	8	9	0·2	—
November	1013	85	76	88	73	77	75	4·6	4·1	9	1	3	39	51	5	1	0	0	0	1	4	39	52	1	1	0	1	1	7	7	0·2	—
December	1011	85	77	89	73	77	76	4·6	4·4	11	5	2	31	52	8	0	0	1	1	5	3	39	57	5	0	0	1	0	7	7	0·3	—
Means	1012	85	76	91*	70**	79	78	4·7	—	—	2	3	38	46	6	2	1	1	1	2	4	35	47	7	2	1	2	1	8	8	—	—
Totals	—	—	—	—	—	—	—	—	77·6	171	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	—
Extreme values	—	—	—	94†	68††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	26	36	36	36	36	36	28	30	34		5																				26	—

Standard of time = Local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

§ 33 knots or over.
‡ ½ (0900 + 1500).

Authorities:—Melbourne, Commonwealth Met. Office.

METEOROLOGICAL OFFICE,
AIR MINISTRY

PLACE—CHRISTMAS ISLAND. LAT. 10° 25′ S., LONG. 105° 43′ E. Height above Mean Sea Level, 18 feet.
Climatic Table compiled from 19 to 41 Years' Observations, 1901 to 1941.

MONTH	PRESSURE at M.S.L. §	AIR TEMPERATURE Mean of				Relative humidity §	Cloud amount Scale 0—10 §	RAIN		WIND DIRECTION § Percentage of observations from									Mean wind force	No. of days with gale‡	No. of days with fog or mist
	Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month			Average fall	No. of days with 0·04 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	Beaufort §		
	mb.	° F.	° F.	° F.	° F.	%		in.													
January	1008	87	75	91	72	85	4·5	8·4	11	1	1	5	14	10	14	15	7	33	2	0·2	Data not available.
February	1008	87	76	91	73	88	5·1	10·9	14	2	3	6	13	4	11	18	12	31	2	0·1	
March	1008	87	76	91	73	88	5·1	10·6	17	2	3	13	12	4	8	13	11	34	2	0·1	
April	1008	88	76	91	74	89	4·7	9·5	15	2	5	28	21	1	2	3	3	35	2	0	
May	1008	87	76	90	73	88	4·5	8·6	14	1	5	33	26	1	1	1	2	30	2	0	
June	1009	86	75	89	72	86	4·5	6·6	12	1	5	38	28	0	0	1	1	26	2	0	
July	1010	85	73	88	70	84	4·0	4·2	11	2	5	38	32	0	0	0	1	22	2	0	
August	1011	86	73	88	70	80	3·8	2·2	6	0	3	42	36	1	0	0	0	18	2	0	
September	1011	86	73	89	70	78	4·1	2·2	4	1	2	37	43	0	0	0	1	16	2	0	
October	1010	87	74	89	71	76	4·2	2·2	4	1	2	27	51	1	1	0	0	17	2	0	
November	1009	87	75	90	72	80	4·7	7·3	6	1	3	17	43	3	2	2	2	27	2	0	
December	1008	87	75	90	72	83	4·8	7·3	10	2	3	8	27	7	10	7	5	31	2	0	
Means	1009	87	75	92*	69**	84	4·5	—	—	1	3	24	29	3	4	5	4	27	2	—	—
Totals	—	—	—	—	—	—	—	80·0	124	—	—	—	—	—	—	—	—	—	—	0·4	
Extreme values	—	—	—	95†	67††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	85	39–40		39–41	40–41	36·7	34–35	39–40	19–20	36									20	31·32	

Standard of time = Local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature

‡ Force 8 or more Beaufort Scale.
§ ½ (0900 + 2100).

Authorities :—MS. data at M.O.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—BATAVIA. LAT. 6° 11′ S., LONG. 106° 50′ E. Height above Mean Sea Level, 26 feet.

Climatic Table compiled from 10 to 72 Years' Observations, 1864 to 1936.

This table represents conditions at the Observatory, about 5 miles from the coast.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount Scale 0—10		RAIN		WIND DIRECTION																		Mean wind speed		No. of days with gale	No. of days with fog or mist
												0600									1300												
	Mean §	Daily max.	Daily min.	Highest in each month	Lowest in each month	0600	1300	0600	1300	Average fall	No. of days with 0·04 in. or more	Percentage of observations from									Percentage of observations from									0600	1300		
												N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm				
	mb.	° F.	° F.	° F.	° F.	%	%			in.																				knots			
January	1010	84	74	88	72	95	75	7·7	7·9	12·1	19	2	4	8	6	5	7	14	7	47	21	4	2	0	2	5	32	31	1	0·4	5	—	—
February	1010	84	74	88	72	95	76	7·9	8·0	12·3	19	2	2	5	8	6	4	8	6	59	17	7	1	0	1	3	38	33	0	0·4	5	—	—
March	1010	85	74	89	72	95	73	7·0	7·3	7·9	17	3	1	8	6	4	6	10	3	59	21	9	2	0	0	4	34	30	0	0·4	5	—	—
April	1009	86	75	90	73	94	70	6·0	6·5	5·2	12	0	1	10	6	1	3	4	2	73	30	29	7	0	0	4	14	16	0	0·2	4	—	—
May	1009	87	75	90	72	94	68	5·7	6·1	4·0	9	1	5	19	7	2	2	1	0	63	22	47	15	1	1	8	5	6	0	0·2	4	—	—
June	1010	86	74	89	71	94	67	5·5	5·9	3·4	8	2	6	11	6	3	1	0	0	71	21	40	24	2	1	2	5	5	0	0·2	4	—	—
July	1010	86	73	89	70	92	63	5·0	5·4	2·3	5	1	2	12	11	4	2	1	0	67	20	37	15	2	2	3	7	13	1	0·4	4	—	—
August	1010	87	73	90	70	91	61	4·8	5·3	1·6	4	0	5	14	13	7	2	0	0	50	32	32	10	2	1	1	4	18	0	0·4	5	—	—
September	1010	88	73	91	71	90	61	5·1	5·3	2·7	6	1	3	21	11	9	3	1	1	50	49	18	5	1	0	1	4	22	0	0·4	6	—	—
October	1010	88	74	92	72	91	64	5·8	6·2	4·4	9	0	1	11	18	8	5	1	1	55	45	17	4	1	2	2	22	0	7	0·4	5	—	—
November	1010	87	74	91	72	93	68	6·7	7·2	5·4	13	1	2	9	8	5	5	8	2	60	38	14	5	2	1	4	16	20	0	0·4	4	—	—
December	1009	85	74	90	72	94	72	7·5	7·9	8·3	16	1	2	6	9	5	8	15	4	50	27	10	1	1	1	4	28	28	0	0·6	4	—	
Means	1010	86	74	92*	69**	93	68	6·2	6·6	—	—	1	3	11	9	5	4	6	2	59	28	22	8	1	1	3	17	19	1	0·4	5	—	—
Totals	—	—	—	—	—	—	—	—	—	69·6	137	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	96†	66††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	70					70		56		72	57	10																		57		—	—

Standard of time = Local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

§ Mean of 24 hours.

Authorities :—Batavia R. Magn. and Meteor. Obs.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—PASOEROEAN. LAT. 7° 38′ S., LONG. 112° 55′ E. Height above Mean Sea Level, 16 feet.

Climatic Table compiled from 8 to 50 Years' Observations to 1936.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount Scale 0—10		RAIN		WIND DIRECTION																		Mean wind force speed		No. of days with gale	No. of days with fog or mist
												0700									1200												
												Percentage of observations from									Percentage of observations from												
	Mean §	Daily max.	Daily min.	Highest in each month	Lowest in each month	0600	1200	a.m.	p.m.	Average fall	No. of days with 0·02 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January	1009	88	74	91	72	91	64	Data not available.		8·9	17	4	0	2	4	24	23	41	2	0	45	16	3	1	0	1	16	18	0	Data not available.		Data not available.	Data not available.
February	1009	88	74	91	73	91	65			11·0	17	3	0	4	7	26	19	40	1	0	51	15	3	1	1	2	11	16	0				
March	1009	88	74	91	72	91	66			8·4	15	2	1	2	6	26	24	35	4	0	50	14	4	1	1	0	9	21	0				
April	1009	88	74	90	71	91	64			5·4	9	2	1	1	9	32	30	25	0	0	56	27	5	1	1	1	3	6	0				
May	1010	88	73	90	68	90	59			3·7	6	2	0	2	3	33	27	32	1	0	62	23	7	1	1	0	1	5	0				
June	1010	87	71	90	66	87	56			2·2	5	2	1	2	2	36	30	25	2	0	53	32	5	1	1	2	3	3	0				
July	1011	87	70	90	65	84	52			1·0	2	1	0	2	7	36	41	13	0	0	51	30	3	1	1	2	5	7	0				
August	1011	87	70	91	65	82	49			0·2	0·6	1	0	1	5	30	40	13	1	0	54	33	2	0	1	1	2	7	0				
September	1011	89	71	91	67	80	49			0·2	0·5	1	0	1	4	34	44	16	0	0	58	32	1	1	1	1	0	6	0				
October	1010	90	73	93	69	79	49			0·7	1	1	0	0	2	36	40	20	1	0	58	32	1	1	0	0	2	6	0				
November	1009	90	75	93	71	81	54			2·4	5	5	0	1	2	25	41	25	1	0	60	26	1	0	1	0	1	11	0				
December	1009	88	74	92	72	87	60			6·5	13	2	1	3	6	24	31	32	1	0	46	25	2	1	1	·2	11	12	0				
Means	1010	88	73	94*	64**	86	57			—	—	2	0	2	5	·31	33	26	1	0	54	25	3	1	1	1	5	10	0	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	50·6	91	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	96†	58††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	30	17				10				50		8																		—	—	—	—

Standard of time = Local

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

§ ⅓ (0900 + 1200 + 1600).

Authorities :—MS. data supplied by R. Magn. and Meteor. Obs., Batavia.
Batavia, Obs. at Secondary stations in the Netherlands Indies.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—KOEPANG. LAT. 10° 10′ S., LONG. 123° 34′ E. Height above Mean Sea Level, 148 feet.

Climatic Table compiled from 3 to 50 Years' Observations, 1879 to 1941.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount Scale 0—10		RAIN		WIND DIRECTION									Mean wind force or speed		No. of days with gale §	No. of days with fog or mist
												0700												
												Percentage of observations from												
	‡ Mean	Daily max.	Daily min.	Highest in each month	Lowest in each month	0800	1400	0800	1200	Average fall	No. of days with 0·02 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%	%			in.														
January . . .	1008	87	75	91	72	85	71	4·1	4·2	15·3	18	16	3	1	1	2	8	15	11	43	Data not available.		0	Data not available.
February . .	1009	87	75	91	72	86	72	3·6	3·8	14·4	16	5	2	0	2	0	3	26	7	55			0	
March . . .	1009	87	74	91	71	86	69	3·2	3·6	8·7	12	7	3	7	0	0	3	5	7	68			0	
April	1010	89	73	92	68	81	55	1·2	2·2	2·5	5	3	7	40	19	5	3	0	3	20			0	
May	1011	89	72	93	67	70	51	1·2	1·7	1·1	3	0	4	50	26	4	0	3	0	13			0	
June	1011	88	71	92	65	69	48	1·0	1·8	0·4	1	0	8	48	20	0	0	1	0	23			0	
July	1012	88	70	91	64	67	45	1·0	1·7	0·2	0·7	4	8	57	13	3	1	0	0	14			0	
August . . .	1012	89	70	94	64	62	44	0·4	0·9	0·1	0·3	0	13	58	14	1	1	0	0	13			0·3	
September . .	1012	91	71	96	65	61	45	0·5	1·1	0·1	0·3	3	20	44	17	2	0	0	5	9			0	
October . . .	1011	92	73	97	68	62	49	0·9	1·9	0·7	1	13	21	15	9	5	1	3	5	28			0	
November . .	1010	92	74	97	71	67	55	1·2	2·6	3·5	7	17	8	9	3	1	1	1	4	56			0	
December . .	1008	89	75	94	72	80	67	2·9	3·8	9·7	15	8	15	11	3	1	1	3	5	53			0	
Means . . .	1010	89	73	98*	63**	73	56	1·8	2·4	—	—	6	9	28	11	2	2	5	4	33	—	—	—	—
Totals . . .	—	—	—	—	—	—	—	—	—	56·7	79	—	—	—	—	—	—	—	—	—	—	—	0·3	—
Extreme values.	—	—	—	101†	60††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations .	21	21				21		10		50	50	3–4											3·4	

Standard of time = Local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

‡ ⅓ (0900 + 1200 + 1500).
§ Force 8 or more Beaufort Scale at 0800.

Authorities :—Batavia, R. Magn. and Meteor. Obs.
Obs. at Secondary stations in the Netherlands Indies.
Hong Kong, Daily Weather Reports.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—MAKASSER. CELEBES. LAT. 5° 08′ S., LONG. 119° 28′ E. Height above Mean Sea Level, 6 feet.

Climatic Table compiled from 54 Years' Observations, 1879 to 1933.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount Scale 0—10		RAIN		WIND DIRECTION																		Mean wind force or speed		No. of days with gale	No. of days with fog or mist
												a.m.									p.m.												
												Percentage of observations from									Percentage of observations from												
	Mean §	Daily max.	Daily min.	Highest in each month	Lowest in each month	0800	1400	a.m.	p.m.	Average fall	No. of days with 0·02 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January	1009	84	74	87	72	87	80	Data not available.		27·0	25	Data not available.																		Data not available.		Data not available.	
February	1010	84	75	87	72	85	77			21·1	20																						
March	1009	85	74	88	72	86	77			16·7	18																						
April	1009	86	74	89	71	83	72			5·9	10																						
May	1010	87	74	90	69	81	70			3·5	8																						
June	1010	86	72	89	68	80	67			2·0	6																						
July	1010	86	70	90	65	77	65			1·4	4																						
August	1010	87	69	90	65	69	65			0·4	2																						
September	1010	87	70	90	64	63	66			0·6	2																						
October	1009	87	72	91	68	66	71			1·7	5																						
November	1009	86	74	89	71	73	73			7·0	11																						
December	1009	84	74	87	72	83	79			24·0	22																						
Means	1010	86	73	92*	64**	78	72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals	—	—	—	—	—	—	—	—	—	112·2	133	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	95†	58††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	4	10–11				11		—	—	50		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Standard of time = Local.

* Mean of highest each year

** Mean of lowest each year.

† Highest recorded temperature.

†† Lowest recorded temperature.

§ Reduced to mean of 24 hours.

Authorities:—Batavia, R. Magn. and Meteor. Obs.
Obs. at Secondary Stations in the Netherlands Indies.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

PLACE—MENADO. LAT. 1° 30′ N., LONG. 124° 50′ E. Height above Mean Sea Level, 5 feet.

Climatic Table compiled from 12 to 50 Years' Observations, 1879 to 1933.

MONTH	PRESSURE at M.S.L.	AIR TEMPERATURE Mean of				Relative humidity		Cloud amount Scale 0—10		RAIN		WIND DIRECTION																		Mean wind force or speed		No. of days with gale	No. of days with fog or mist
												a.m.									p.m.												
												Percentage of observations from									Percentage of observations from												
	Mean §	Daily max.	Daily min.	Highest in each month	Lowest in each month	0600	1400	a.m.	p.m.	Average fall	No. of days with 0·02 in. or more	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calm	a.m.	p.m.		
	mb.	° F.	° F.	° F.	° F.	%	%			in.																							
January . .	1010	85	73	89	70	93	74	Data not available.		18·3	21	Data not available.																		Data not available.		Data not available.	Data not available.
February . .	1010	85	73	89	70	92	73			14·1	18																						
March . . .	1010	85	73	89	70	92	74			12·0	16																						
April . . .	1009	87	73	90	71	92	73			7·8	13																						
May . . .	1009	87	74	90	71	91	71			6·3	13																						
June . . .	1008	87	74	90	71	90	70			6·4	13																						
July . . .	1009	87	73	91	70	86	64			4·7	9																						
August . .	1009	89	74	93	69	83	60			3·8	9																						
September .	1009	89	73	93	69	86	63			3·4	8																						
October . .	1009	89	73	92	69	90	64			4·8	10																						
November. .	1009	87	73	91	70	92	72			8·6	14																						
December. .	1008	86	74	89	71	92	73			14·6	19																						
Means . . .	1009	87	73	94*	67**	90	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Totals . . .	—	—	—	—	—	—	—	—	—	104·8	163	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Extreme values	—	—	—	96†	63††	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
No. of years' observations	15	12–15		12–15		13–15		—	—	50		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Standard of time = Local.

* Mean of highest each year.
** Mean of lowest each year.

† Highest recorded temperature.
†† Lowest recorded temperature.

§ Reduced to mean of 24 hours.

Authorities :—Batavia, K. Mag. and Meteor. Obs. in the Netherlands Indies.
„ „ „ „ „ Verhanderlingen No. 24.

METEOROLOGICAL OFFICE,
AIR MINISTRY.

The upper figures denote the average number of days on which rain fell, the lower give the mean rainfall in inches.

Place	Lat.	Long.	No. of Years Obs.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
						Java, north coast.										
Batavia	6° 11′ S.	106° 50′ E.	50	20	19	16	12	9	8	6	4	6	9	13	16	138
				12·0	12·6	8·3	5·5	4·3	3·6	2·6	1·7	2·7	4·7	5·6	7·8	71·4
Indramajoe. . . .	6° 20′ S.	108° 19′ E.	45	15	14	12	11	10	8	5	3	3	6	9	14	110
				11·7	10·8	6·1	5·9	5·2	4·3	2·8	1·2	1·3	3·0	4·8	7·6	64·7
Cheribon	6° 43′ S.	108° 34′ E.	39	21	18	17	11	9	8	5	3	3	5	10	18	128
				17·9	14·1	12·7	8·0	5·7	4·1	2·5	0·9	1·6	2·7	5·9	13·0	89·1
Tegal	6° 52′ S.	109° 08′ E.	50	17	16	12	8	6	5	4	3	2	4	7	13	96
				14·4	12·2	9·1	5·2	4·0	3·5	2·5	1·3	1·3	2·1	5·0	10·6	71·2
Pekalongan. . . .	6° 54′ S.	109° 40′ E.	50	20	19	15	12	9	7	6	6	5	7	10	16	132
				18·6	16·0	9·3	6·5	4·8	4·4	3·3	3·1	2·6	3·5	4·5	10·6	87·2
Semarang	6° 58′ S.	110° 25′ E.	50	20	18	16	13	10	7	5	5	6	10	14	18	142
				14·4	13·5	9·4	7·6	5·4	3·3	2·6	2·4	3·6	5·2	7·7	10·3	85·4
Rembang	6° 42′ S.	111° 21′ E.	48	16	14	12	9	7	5	3	2	3	5	9	15	100
				10·0	8·0	7·9	4·6	4·0	3·1	1·3	0·9	1·3	2·3	5·0	8·1	56·5
Surabaya	7° 14′ S.	112° 47′ E.	50	19	18	17	13	9	7	3	2	1	3	9	16	117
				12·4	11·7	10·5	7·0	4·3	3·4	1·9	0·6	0·6	1·5	4·7	9·9	68·5
Pasoeroean	7° 38′ S.	112° 55′ E.	50	17	17	15	9	6	5	2	0·6	0·5	1	5	13	91
				10·0	11·0	8·4	5·4	3·7	2·2	1·0	0·2	0·2	0·7	2·4	6·5	51·7
Probolinggo . . .	7° 46′ S.	113° 15′ E.	50	15	14	12	7	5	4	2	0·8	0·5	2	5	12	79
				9·3	9·2	7·2	4·1	3·0	1·8	0·7	0·3	0·2	0·6	2·2	6·5	45·1
Soemenep (Madoera) .	7° 01′ S.	113° 54′ E.	50	17	15	15	10	8	6	3	0·9	0·7	2	8	15	101
				11·2	10·9	10·2	6·7	4·8	3·5	1·8	0·3	0·4	1·4	4·6	10·3	66·1
						Java, south coast.										
Tjilatjap	7° 44′ S.	109° 01′ E.	50	19	17	17	17	15	13	12	10	11	17	20	20	188
				11·3	10·7	12·0	10·9	11·6	13·0	9·6	7·8	8·3	18·0	18·3	15·4	146·9
Patjitan	8° 12′ S.	111° 07′ E.	50	19	17	16	10	9	7	6	5	5	10	14	18	136
				14·3	15·0	11·4	6·1	5·9	5·1	3·0	2·9	2·4	8·9	12·0	15·0	102·0

Place	Lat.	Long.	No. of Years Obs.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Islands eastward of Java.																
Singaradja (Bali)	2° 30′ S.	114° 55′ E.	46	15	14	13	7	5	3	1	0·8	0·6	2	6	14	81
				9·6	9·6	8·1	3·9	2·2	1·5	0·7	0·2	0·2	0·6	2·8	7·1	46·5
Ampenan (Lombok)	8° 20′ S.	116° 03′ E.	34	13	11	10	7	5	3	3	2	3	7	10	15	89
				7·6	6·7	6·9	3·6	2·8	2·5	1·7	1·1	1·5	4·8	5·7	10·2	55·1
Bima (Soembawa)	8° 30′ S.	118° 52′ E.	48	15	15	13	8	5	3	1	1	1	5	10	15	92
				8·4	8·2	7·4	5·2	2·4	1·4	0·6	0·4	0·5	1·9	5·0	8·5	49·9
Koepang (Timor)	10° 10′ S.	123° 34′ E.	50	18	16	12	5	3	1	0·7	0·3	0·3	1	7	15	79
				15·3	14·4	8·7	2·5	1·1	0·4	0·2	0·1	0·1	0·7	3·5	9·7	56·7
Borneo, south and east coasts.																
Bandjermasin	3° 30′ S.	114° 38′ E.	50	22	19	19	15	13	12	9	9	8	12	16	21	175
				12·8	11·9	11·7	8·7	6·3	5·7	3·8	3·4	3·9	5·3	8·5	12·6	94·6
Balik Papan	1° 20′ S.	116° 50′ E.	30	14	12	14	12	12	12	11	10	9	10	11	15	142
				8·1	7·1	9·3	7·3	8·5	7·4	6·8	6·3	5·2	5·5	6·4	7·8	85·7
Celebes, west and south coasts.																
Donggala	0° 50′ S.	119° 55′ E.	35	11	10	9	7	8	9	8	7	6	6	8	10	99
				7·6	6·1	6·2	4·2	3·9	5·0	3·8	3·4	2·7	2·3	4·4	5·6	55·2
Makasser	5° 20′ S.	119° 28′ E.	50	25	20	18	10	8	6	4	2	2	5	11	22	133
				27·0	21·1	16·7	5·9	3·5	2·9	1·4	0·4	0·6	1·7	7·0	24·0	112·2
Djene Aloe	5° 37′ S.	119° 29′ E.	46	18	15	12	8	7	5	3	0·9	0·9	3	8	16	97
				17·8	15·0	9·7	4·3	3·9	2·7	1·3	0·4	0·5	1·7	5·9	15·2	78·4
Celebes, east and north coasts.																
Poso	1° 23′ S.	120° 45′ E.	32	13	12	13	14	15	15	13	10	9	9	10	11	144
				7·4	7·6	10·0	9·6	10·1	8·7	8·7	6·2	5·5	5·4	6·7	6·5	92·4
Gorontalo	0° 31′ N.	123° 03′ E.	47	10	9	9	11	11	10	8	7	5	6	9	12	107
				4·4	4·8	4·4	5·0	4·3	4·5	3·6	3·0	1·8	2·6	4·3	5·3	48·0
Menando	1° 30′ N.	124° 50′ E.	50	21	18	16	13	13	13	9	9	8	10	14	19	163
				18·3	14·1	12·0	7·8	6·3	6·4	4·7	3·8	3·4	4·8	8·6	14·6	104·8
Kwandang	0° 50′ N.	122° 45′ E.	47	15	13	11	10	11	11	7	6	6	9	12	14	125
				12·5	10·2	7·9	6·7	7·7	6·7	4·6	4·1	3·9	5·6	8·7	10·2	88·8

Authority :—Batavia, K. Mag. Met. Obs. Verhandl. 24. Rainfall in the Netherlands Indies. Vol. I.

METEOROLOGICAL OFFICE, AIR MINISTRY,
SOUTH KENSINGTON, S.W.7.

CHAPTER II

COCOS ISLANDS AND CHRISTMAS ISLAND

Chart 2510.

COCOS OR KEELING ISLANDS.—Cocos or Keeling islands are situated about 600 miles south-westward of Java head, nearly in the direct route of vessels proceeding to Sunda strait via the Cape of Good Hope. They are in two distinct divisions, lying north and south, having a channel between about 15 miles wide; the northern division consists of one island only, whilst the southern division comprises a group of about 20 islands. Direction and Home islands are the only islands permanently inhabited. The estimated population, in 1948, was about 1,700.

The islands are officially under the administration of the Government of Singapore, which is represented by a Malayan Civil Service Administrator.

Climate and weather.—*See* page 17.

South Keeling.—The islands of the southern division or South Keeling form a roughly broken circle nearly approaching the horseshoe shape common to coral atolls. All the islands are covered with coconut palms and scrub.

Outside, and nearly all round the group, a natural barrier protects the lagoon, rendering it smooth inside. Seaward of this barrier, on which the sea breaks continually, there is a sudden slope to deep water. The lagoon is studded with many coral heads and pinnacles, particularly in its southern and eastern parts and on the reefs running from Horsburgh island (page 34) towards Home and West islands. These parts of the lagoon are navigable only by light-draught boats with local knowledge. On the western side of the lagoon and in Port Refuge (page 35) there are numerous coral heads with deep water between them. Much of this coral is growing and many heads are not shown on the chart.

The land is evidently rising, and will eventually form a continuous island, surrounding the lagoon with a crater-like edge, similar to North Keeling. In 1945, the maximum elevation was 41 feet ($12^{m}5$); the tops of the palm trees vary between an elevation of 40 and 60 feet ($12^{m}2$ and $18^{m}3$).

Direction island.—Lights.—Beacon.—Direction island (*Lat. 12° 05′ S., Long 96° 53′ E.*), situated at the north-eastern corner of the group, is about 7 feet ($2^{m}1$) high and is partly leased by Cables and Wireless, Ltd., which has offices and quarters near the western end.

Chart 748b.

Chart 2510.

There is a pier, 130 feet (39^{m}6) long, on the south-western side of the island, with a depth of 4 feet (1^{m}2) at its head. There is a derrick on the pier with a lifting capacity of one ton. The pier is connected to the storehouses and offices by a light railway. The ruins of a house are situated on the western extremity, and Brown house stands on the western side about 1½ cables from the southern extremity.

A light is occasionally exhibited from a mast on the northern side of the island, and also one from the head of the pier.

A black triangular beacon stands on the western end of a rocky ledge which extends about 2 cables westward from the southern extremity of the island.

Home island.—Home island, lying about one mile southward of Direction island, contains the native settlement, which had, in 1944, a population of 1556. The village, which occupies the greater part of the island, is clean and well laid out. The boat harbour, which is enclosed by a breakwater, has a depth of about 3 feet (0^{m}9), gradually decreasing to one foot (0^{m}3) alongside the pier, on which there is a crane with a lifting capacity of half a ton. A light railway runs from the prominent shed on the pier-head to the Great House, the residence of the Clunies-Ross family, and to the workshops and copra sheds. The approach channel, which is marked by white wooden beacons, is shallow and intricate. The boat track between Direction and Home islands is indicated on the chart, and should only be used by those with local knowledge.

There are two islets between Direction island and Home island (*Lat. 12° 07′ S., Long. 96° 54′ E.*). Prison islet, the northern, has a conspicuous small group of palm trees on it, and Pulo Gangsa is used as a cemetery. The latter islet is bordered by a sea wall, as is also the north-western end of Home island.

There is a group of eleven islets southward of Home island, which can only be approached by vessels of light-draught.

South island.—South island which, with West island, forms the southern half of the group, has a sandy ridge, from 10 to 20 feet (3^{m}0 to 6^{m}1) high, running along its southern and eastern edges, terminating at its southern extremity with a hill 41 feet (12^{m}5) high. The island is infested with land crabs.

Between the western extremity of South island and the eastern extremity of West island are Pulo Klapa Satu, Pulo Blan, Pulo Blan Madar and Pulo Maria, all of which are noticeable from the northern part of the lagoon and from seaward.

West island.—West island is low and contains two lagoons on its inner side, known as North and South lagoons, which are almost silted up. There are two iron piers on the eastern side of the island, 2½ and 4 cables, respectively, from Ujong Tanjong, the northern extremity of the island; the northern pier has a depth of 3 feet (0^{m}9) at its head and the southern pier 2½ feet (0^{m}8). The approach to the southern end of the island is very shallow and consists of an extensive sand and coral mud bank which dries. Farther north landing can be effected from boats at any state of the tide. The island is infested by rats.

Horsburgh island.—Horsburgh island is the northernmost island of the group. There is a pier close to Possession point, the south-eastern extremity of the island; there is a depth of 1½ feet (0^{m}4) at

Chart 748b.

Chart 2510.

its head, and is approached by passing close northward of the wreck, situated about one mile south-eastward of Possession point, and thence between numerous coral heads, some of which dry 2 feet (0^{m}6). In 1947, the wreck was reported to be difficult to identify. There is a residence on the island and an iron framework tower, 85 feet (25^{m}9) high, stands on Possession point; it is partly hidden by palm trees from some directions.

Port Refuge.—Port Refuge, in the northern part of the lagoon between Horsburgh and Direction islands, comprises an outer and an inner harbour. Caution should be exercised when approaching as the bottom rises very steeply from the ocean depths to the 10-fathom (18^{m}3) line. The change of colour of the water from a dark to a light shade of blue is, however, very marked; it can be seen from some distance and may be relied on as a guide. The change occurs near the 10-fathom (18^{m}3) line in all conditions and marks the outer edge of the shelf which slopes gently up from 10 to 6 fathoms (18^{m}3 to 11^{m}0) and forms the outer harbour. The bottom is normally visible everywhere in Port Refuge where the depth is less than 8 fathoms (14^{m}6).

Submarine cables.—Submarine cables run westward from the south-western side of Direction island and thence northward off its western end. A telephone cable also runs between Direction and Horsburgh islands, and is indicated on the chart.

The Lagoon.—Although Port Refuge is included in the lagoon proper, the name is usually applied to that part of the lagoon southward of Port Refuge. The lagoon is separated from Port Refuge by a ridge which runs from the reef southward of Horsburgh island to the very shoal water westward and south-westward of Home island (*Lat. 12° 07′ S., Long. 96° 54′ E.*).

The bottom in the lagoon is very uneven. In its southern and eastern parts it consists of coral heads and ridges with deep pools between; in its northern and western parts it is generally deeper with a sandy bottom, but many coral reefs and pinnacles rise very steeply and constitute dangers against which sounding gives no warning. Only the waters of the recommended route, the moored berth and the anchorages have been closely examined, and uncharted dangers may exist in other parts. Even on the recommended route mariners are advised to navigate with great caution and not to leave the channel.

The visibility of the bottom in the lagoon is in marked contrast to that in Port Refuge. It is normally only visible at slack water when the sea is calm with the sun behind, though rocks, with depths of less than 3 fathoms (5^{m}5) over them, can often be distinguished at distances up to 400 feet (121^{m}9) in good conditions.

There are two entrances for ships into the lagoon, one at the northern end through Port Refuge, and the other, known as Western entrance, on the western side. There is also a passage known as the Boat channel about one mile southward of Horsburgh island, but this should not be used without local knowledge.

Beacons.—Buoyage.—Cooper's beacon, surmounted by a red diamond shape, stands on a rock about 2¼ miles south-south-eastward of Possession point.

A cairn, surmounted by a cross, 14 feet (4^{m}3) high, stands on the

Chart 748b.

Chart 2510.

southern extremity of a sandbank, about 5½ cables south-south-eastward of the light on the northern side of Direction island.

Hood beacon, painted in red and white chequers, is situated 11 cables south-south-eastward of the northern extremity of West island.

A white spherical buoy, surmounted by a pole, marks a 17-foot ($5^{m}2$) patch, about 6¾ cables south-westward of the western extremity of Direction island. A similar, but smaller, white spherical buoy, marks the southern edge of the reef on the northern side of the inner harbour, about 3½ cables southward of the western extremity of Direction island. A mooring buoy is situated one mile northward of Cooper's beacon. A black spherical buoy lies 3½ cables north-westward of the same beacon ; a mooring buoy, a spherical buoy and a can buoy, all painted black, are situated about 5½, 8 and 10 cables, respectively, west-south-westward of Cooper's beacon.

Anchorages.—There are two anchorages in the outer harbour, suitable for medium to large vessels, on the shelf inside the 10-fathom ($18^{m}3$) line. The western anchorage is in a depth of 7 fathoms ($12^{m}8$), coral and sand, with Cooper's beacon (*Lat. 12° 07′ S., Long. 96° 52′ E.*) in line with the middle of the gap between Pulo Blan Madar and Pulo Maria, bearing 175½° and the western extremity of Direction island in line with Brown house, 096°.

The eastern anchorage is in a depth of 8 fathoms ($14^{m}6$), coral and sand, with the eastern extremity of Pulo Maria bearing 180° and the western extremity of Direction island in line with Brown house, 096°. This anchorage is close to the submarine cables running northward (*see* page 35) ; vessels should take care not to anchor eastward and northward of the pecked line indicated on the chart.

The anchorages in the outer harbour may be used by vessels up to a draught of 25 feet ($7^{m}6$) ; they provide good shelter from the prevailing south-easterly winds, but they are completely open to northerly winds, and the shelter is poor if the wind or ocean swell is northward of east. There is always a noticeable decrease of the swell inside the 6-fathom ($11^{m}0$) line. The holding ground is good but there is a danger of loss of ground tackle due to the coral.

There are two anchorages and a mooring buoy in the inner harbour. The western anchorage, known locally as the " Blue patch " from the colour of the deep water, is suitable for small to medium-sized vessels. It lies in a depth of 9 fathoms ($16^{m}5$), sand, about 7½ cables west-south-westward of the southern extremity of Direction island.

The eastern anchorage is in a depth of 8 fathoms ($14^{m}6$), sand, 3¾ cables westward of the cairn situated about one cable southward of the southern extremity of Direction island.

A mooring buoy lies about one mile northward of Cooper's beacon ; the berth is suitable for vessels with a draught up to 21 feet ($6^{m}4$), and there is good shelter from the swell and from all except northerly winds.

The anchorages in the inner harbour give far superior shelter in all conditions to that given in the outer harbour or at the mooring buoy, but the narrow entrance with its sharp turn and the lack of swinging room make them unsuitable for large vessels.

There is a berth for a vessel, 375 feet ($114^{m}3$) long, between two mooring buoys, in a depth of 16 feet ($4^{m}9$), sand, one mile eastward of the northern extremity of West island ; it is connected to West island

Chart 748b.

Chart 2510.

by a submarine oil pipeline. There are two anchorages for small vessels in positions about 1¾ miles east-north-eastward of the northern extremity of West island and about 3 cables north-eastward of the berth between the mooring buoys, the former in a depth of 5½ fathoms (10$^{\mathrm{m}}$1), sand and coral, and the latter in 4½ fathoms (8$^{\mathrm{m}}$2), sand and coral.

Directions.—The anchorages in the outer harbour are best approached on the leading lines given above.

A vessel should approach the inner harbour with Cooper's beacon (*Lat. 12° 07′ S., Long. 96° 52′ E.*) in line with the eastern extremity of Pulo Maria, bearing about 179°; when the western point of Direction island bears about 069° she may steer for the mooring buoy situated 9 cables south-westward of that point. If proceeding to the anchorages in the eastern part of the inner harbour she should alter course so as to pass southward of the large white spherical buoy and thence for the anchorages. Care should be taken to avoid the coral reefs on either side of the channel leading to the anchorages; these reefs are, however, nearly always visible.

A vessel proceeding towards the lagoon should steer as directed above for entering the inner harbour, and after passing the large white spherical buoy should continue southward until Prison islet bears 090°, when she should alter course south-westward and be guided by the chart to the anchorages east-north-eastward and eastward of the northern extremity of West island. There is a least depth of 13 feet (4$^{\mathrm{m}}$0) on this route and a least width of 350 feet (106$^{\mathrm{m}}$7). It is not affected by the swell except at its northern end near the anchorages in Port Refuge, where the depths and width of the channel are ample.

Western entrance.—The western entrance lies between the reef extending about 6 cables northward from Ujong Tanjong and Turk reef, about 8 cables farther north-north-eastward, and is encumbered with numerous coral heads and dangers. There are two channels but their use is not recommended on account of the ocean swell which is usually prevalent. A complete line of breakers was observed across the entrance when there was a moderate ocean swell from north-westward and a fresh northerly wind.

The northern channel has a least depth of 16 feet (4$^{\mathrm{m}}$9) in it, and the southern channel 15 feet (4$^{\mathrm{m}}$6), and both channels are bordered by dangers on either side. The southern channel should only be attempted in boats.

Tidal streams.—Current.—In Port Refuge the south-going stream has a rate of three-quarters of a knot. The Equatorial current sets north-westward outside the atoll at a rate of about 18 miles a day, and is increased during the period when the south-going stream is setting into the lagoon; during the north-going stream there is little or no current.

In the western entrance the in-going stream is weak, and the out-going stream, which sets north-westward, has a rate of about half a knot.

The general movement of the water in the lagoon is inwards over the reefs between the eastern and southern islands and through Port Refuge, and outwards between West and Horsburgh islands. Slack water occurs at high and low water by the shore.

Harbour facilities.—Poultry, pigs and sheep can be obtained.

Chart 748b.

Chart 2510.

The lagoon teems with fish and there are also a few turtle and large clams. Sharks are numerous and barracouta have been seen in the inner harbour. Jungle fowl are found on most of the large islands; rats, and the white ant, are very destructive. Bananas and papaws are grown.

Water is obtained from shallow wells, from 3 to 9 feet ($0^{m}9$ to $2^{m}7$) in depth, except on Direction island, where it can be obtained only from rain-water tanks.

Small repairs can be effected on Home island (*Lat. 12° 07′ S., Long. 96° 54′ E.*).

Communication.—There is telegraphic communication with Perth, Durban, Seychelles, Zanzibar and Colombo via Rodriguez and Mauritius. *See* also page 10. A Naval auxiliary vessel occasionally visits the island with supplies.

Health.—The climate of the islands is exceedingly healthy during the greater part of the year, when it is said to resemble the climate of southern Europe in the summer. June to August are said to be the healthiest months. The hot, close nights usually experienced in the tropics are few.

Disease is rare, though asthma is fairly prevalent amongst the natives. An epidemic of influenza in 1894, and another of measles, in 1945, caused several deaths.

There is a doctor employed by the Cable Company.

Standard time.—Information regarding Standard time will be found in the Admiralty List of Radio Signals, Vol II.

Chart 2510, plan of North Keeling island.

North Keeling island.—North Keeling (*Lat. 11° 50′ S., Long. 96° 49′ E.*), 15 miles northward of the South Keeling group, is a low strip of coral, thickly covered with coconut trees, enclosing a lagoon; there is a small break on the eastern side, but the lagoon cannot be entered through it. The only landing place is on the western or lee side of the island; and it is not always practicable on account of the surf; if the wind gets northward of east this landing-place is dangerous.

The island is situated on a reef, from which a spit is stated to extend one mile north-westward. Heavy rollers at times rise suddenly off the south point, making it dangerous to approach. Soundings are reported to extend nearly 5 miles south-south-westward, and also for 3 miles eastward of the island. A 6-fathom ($11^{m}0$) patch was reported, in 1914, to lie about half a mile south-westward of the island, and the reefs on the south-western and south-eastern sides of the island are stated to have extended considerably.

The wreck of the German warship *Emden* lies on the southern extremity of North Keeling; the boilers and part of the main engines were visible in 1931 at low water.

Supplies.—A few jungle fowl are preserved; the island is also the resort of vast numbers of sea birds. Turtle are found in the lagoon, as well as quantities of various fish, including grey mullet, sharks, and dog-fish; the seine cannot be used with any effect, but there is a fish which may be taken on a rod. Good water may be obtained from a well near the landing-place.

Anchorage.—In 1902, H.M.S. *Vestal* anchored, in a depth of 5 fathoms ($9^{m}1$), about 2 cables offshore, with the western extremity

Chart 748b.

Chart 2510, plan of North Keeling island.

of the island bearing 179°. The anchorage is not good, however, and a vessel should be ready to proceed to sea if the wind shifts to the westward of north, as rollers are very liable to set in.

Charts 748a, 748b.

MARIA AUGUSTINA BANK.—In 1856, the captain of the Spanish frigate *Maria Augustina,* when cruising about 540 miles east-by-south of the Cocos islands, perceived a change in the colour of the water, and soundings taken immediately showed depths of 11, 9, 7, 5, and 13 fathoms (20^{m}1, 16^{m}5, 12^{m}8, 9^{m}1, and 23^{m}8), sand and mud; at the same time a black object, on which the sea broke, was observed about half a mile northward of the vessel. After sailing a further 7½ miles on a course 211° soundings of 6, 8, and 10 fathoms (11^{m}0, 14^{m}6, and 18^{m}3) were obtained. From good observations taken at the time, and verified later at Java head, the southern entrance point of the western end of Sunda strait, the position of the rock was established at lat. 14° 05′ S., long. 105° 56′ E.

Discoloured water had been previously reported, in approximately the same position, by the master of the *Helen Stuart* in 1845, who stated that he ran over a milk-white patch for about 50 miles in an east and west direction; no soundings, however, were taken.

The existence of the above bank is considered doubtful.

Chart 3504.

CHRISTMAS ISLAND.—Christmas island, about 530 miles east-by-north of the Cocos islands and 220 miles southward of Java head, is of limestone formation, densely wooded and steep-to, and in clear weather may be seen for a distance of 30 miles or more. Seen from northward or southward, it is saddle-shaped, the middle being considerably lower than the east and west portions; and from the sea the island rises to a central plateau in successive terraces and cliffs. The sea face of the island is composed of perpendicular and almost continuous cliffs, from 20 to 40 feet (6^{m}1 to 12^{m}2) high, much underworn in places, rendering the island inaccessible, except where the cliff has crumbled away and formed rough beaches, on which, when it is the lee side, landing may at times be effected. The coast in places is undermined by caves ending in vents or "blow-holes" some distance from the sea, through which columns of spray are driven 60 or 70 feet (18^{m}3 or 21^{m}3) into the air. Except in Flying Fish cove, on the northern side of the island, the depths at one cable or less offshore are about 100 fathoms (182^{m}9), affording no anchorage. Depths of about 1,000 fathoms (1,828^{m}8) are found from 2 to 3 miles from the land; the bottom off the eastern side of the island is of a volcanic nature.

Large deposits of phosphate of lime exist on the island. The phosphate quarries are situated at the south-eastern corner of the island, and are connected to Flying Fish cove (*Lat. 10° 25′ S., Long. 105° 43′ E.*) by a railway running along the top of the plateau; from the railway terminus on the plateau above Flying Fish cove there is a cable railway down a steep cutting, by which trucks are lowered to ground level and are then taken to the loading-piers.

Chart 3504, plan of Flying Fish cove.

Flying Fish cove.—Flying Fish cove lies at the eastern end of

Chart 3504, plan of Flying Fish cove.

a bight formed on the north coast of Christmas island between North-west point and Rocky point. A coral shelf, with white sand, fronts the beach of the cove, and extends for about one cable into a depth of 5 fathoms (9$^{\text{m}}$1); beyond this the water deepens very rapidly, with depths of over 70 fathoms (128$^{\text{m}}$0) about 2 cables offshore, the bottom being rocky and uneven.

The settlement of the Christmas island Phosphate Company, situated in Flying Fish cove, consists of houses for the Europeans and quarters for the Chinese and Malay employees, also a drying factory and storehouses for the phosphate. Over 500 coolies are employed. A Straits Settlement District officer resides on the island, and there is a magistrate's house and police station. A hospital for the employees, equipped with an X-ray apparatus and under the charge of a British doctor, is maintained by the Phosphate Company. In 1931, the population was 715, all employees of the Phosphate Company except the District officer and his staff.

Flying Fish cove (*Lat. 10° 25′ S., Long. 105° 43′ E.*) has been declared a port within the meaning of the Singapore Merchant Shipping Ordinance of 1910, the limits of the port being Smith point, on the western side, to a point situated one-third of a cable northward of Isabel beach, on the eastern side.

Piers.—Beacons.—Buoys.—There are three piers of light steel construction, each about 50 feet (15$^{\text{m}}$2) in height; vessels cannot actually berth alongside them, but lie at moorings a few feet off heading northward. The two northern piers front the phosphate storing sheds, and are used exclusively by vessels loading phosphate, which is delivered rapidly by chutes. The southern pier is triangular in shape, and is equipped with two cranes with a lifting capacity of 3 tons. The maximum length of a vessel that can be berthed close in to this pier is reported to be 365 feet (111$^{\text{m}}$2), but it is believed that vessels of even greater length could be safely berthed a little farther out. In 1945, a wreck, with a depth of 18 feet (5$^{\text{m}}$5) over it, lay close off this pier, which could only be used by vessels up to 250 feet (76$^{\text{m}}$2) in length.

The lines of approach to the northern and triangular piers are indicated by leading beacons; the front beacons are surmounted by triangles and the rear beacons by inverted triangles. The marks for the northern pier are situated on the hillside east-north-eastward of Isabel beach, and, in line, bear 077°. Those for the triangular pier are situated on the northern side of the pier and on the north-western corner of a bungalow about 1¾ cables east-south-eastward; in line, they bear 108°.

About 1¾ cables south-south-westward of the triangular pier there is a break in the coral reef, known as the boat channel, off which a vessel can anchor with her stern secured to a mooring buoy laid about one cable offshore. The line of approach to this anchorage and to the boat channel is marked by leading beacons; the front beacon is surmounted by an inverted triangle, and the rear beacon by a triangle, apex up; in line, they bear 154°. This berth has been occupied by a vessel, 360 feet (109$^{\text{m}}$7) in length, with her stern 120 feet (36$^{\text{m}}$6) from the mooring buoy when secured. The procedure for anchoring is the same as for berthing at the piers.

A vessel should approach on the appropriate leading line with the

Chart 748b.

Chart 3504, plan of Flying Fish cove.

port anchor lowered to about 60 fathoms (109m7); as soon as the anchor holds she should turn on it and veer sufficient cable to allow her to come close in to the pier, when she can be secured to buoys head and stern. There are two pilots belonging to the Phosphate Company, who undertake the berthing of vessels.

Vessels should not attempt to take up a berth at night, nor until the pilot is on board. Owing to the exposed conditions every precaution should be taken for the safety of the vessel; if making more than the briefest stay a second anchor should be down, and fires always banked, with steam ready at short notice. A red flag is displayed at the flagstaff, situated about half a cable south-eastward of Smith point, when the anchorage is dangerous. The tidal streams set north-eastward and south-westward, the latter sometimes attaining a rate of 2 knots.

Chart 3504, with plan of Flying Fish cove.

Harbour facilities.—Communication.—The landing in Flying Fish cove is at steps on the triangular pier, also on a beach 2 miles east-south-eastward of North-west point, where a narrow, sandy channel, about 80 feet (24m4) in length, gives direct access to the shore; at a place known as the Waterfall, about 2¾ miles southward of North-east point, passengers and mails are sometimes landed from the Phosphate Company's steamer when the swell is too great in Flying Fish cove (*Lat. 10° 25′ S., Long. 105° 43′ E.*).

The Phosphate Company's steamer calls at Christmas island from Singapore occasionally; this vessel also visits the Cocos islands occasionally.

There is a radio station at Flying Fish cove. *See* page 10.

Vessels cannot depend on being provided with provisions or coal; a small quantity of fruit and vegetables might be obtained when in season. Water from springs is plentiful, and it is also laid on to the piers. Pigeons are numerous on the island; one variety, known as *Carpophaga Whartoni*, being unique, is protected. Gannets, frigate, and other sea birds are plentiful; turtle deposit their eggs on the beaches, and an edible fresh-water crab is common.

Chart 748b.

CHAPTER III

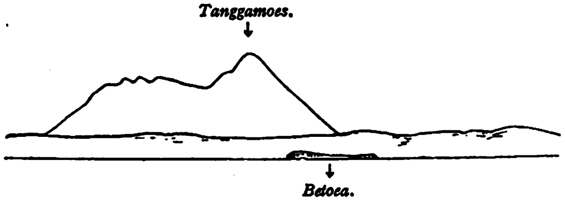
SUNDA STRAIT

Chart 2056.

SUNDA STRAIT.—Sunda strait, known by the Dutch as Straat Soenda, is the principal connection between the Indian ocean and the Java sea, and separates the large islands of Java and Sumatra. The western entrance, between Java head, the western extremity of Java, and Vlakke hoek, in Sumatra, about 64 miles north-westward, is very deep in the southern part, but in the northern part a bank, with depths of about 30 fathoms ($54^{m}9$), and less, extends for 25 miles southward from the southern end of the Benkoelen peninsula, when it falls suddenly into depths of over 100 fathoms ($182^{m}9$). In the middle of this entrance there are depths of over 1,000 fathoms ($1828^{m}8$), but inside the strait the depths decrease rapidly, and there are not more than about 50 fathoms ($91^{m}4$) between Derde (Third) punt, in Java, and the Legoendi eilanden, off the Sumatra shore. Channels, with depths of from 60 to 70 fathoms ($109^{m}7$ to $128^{m}0$), have been scoured out by the current on either side of Dwars in den weg (*Lat. 5° 57′ S., Long. 105° 51′ E.*), thereby forming a bank with depths of under 20 fathoms ($36^{m}6$), which extends about 7 miles south-westward from the south-western side of that island.

In the outer part of the strait the bottom consists of sand and mud, and sand mixed with stone in the northern or inner portion; in the channel on either side of Dwars in den weg the bottom is sand mixed with stone and shells.

The strait can be entered from westward by Behouden passage, between the Java coast and Prinsen eiland (Princes island) or by Great channel, between that island and Krakatau. Vessels can then pass on either side of Dwars in den weg; the fairway of the eastern channel is clear, but in the western is Stroom klip, and farther north-eastward is Winsor klip. On the northern side of the strait there is a clear



Tanggamoes, bearing 028°.
(*Original dated* 1929.)

Charts 1653a, 941a, 1263.

Chart 2056.

channel between Sebesi and Seboekoe, and also between the latter and Sumatra. For Directions, *see* page 66.

Climate and weather.—*See* page 17.

Aspect.—The coast of Sumatra, which forms the northern side of the strait, slopes gently down to the sea; it is densely wooded, and has several high peaks inland, Tanggamoes (Tanggamus), at the head of Semangka baai, being 6,896 feet (2,101^{m}9) high, with a regular sharp cone; this peak and Taboean, an island in the entrance of the bay, are the first to be made out when approaching Vlakke hoek (*Lat. 5° 56′ S., Long. 104° 33′ E.*).

The Java coast is not so high, and has a low coastal district over a great portion of its length; it is also densely wooded, and cultivated here and there in the northern part. There are several high islands in the strait. *See* views facing pages 44, 49, and 52.

Tidal streams.—The tidal streams in Sunda strait, in contrast to the weak, almost continual semi-diurnal vertical movement, are strong and of a mainly diurnal character. The diurnal character of the tidal stream, in addition to being influenced by a very weak semi-diurnal stream, is also altered by a current setting south-westward in all months, which emanates from Banka strait, and flows along the south-east coast of Sumatra towards, and thence through, Sunda strait; in the South-east monsoon the current through Sunda strait is further strengthened by the monsoon current which flows westward along the north coast of Java and thence through Sunda strait. During November a current flows north-eastward through Sunda strait. During the East monsoon vessels making for Sunda strait from northward will sometimes observe sharply defined tide-rips off the entrance; when this is the case a current will almost certainly be found setting south-westward through the strait.

The following is a summary of the streams in Sunda strait:—

(*a*) A constant south-west-going current from the Java sea to the Indian ocean, except in November; rate in the East monsoon three-quarters of a knot, in the West monsoon a quarter of a knot.

(*b*) Tidal stream, main direction north-east or south-west; character, mixed but mainly diurnal.

Diurnal stream	$\frac{\text{Spring}}{\text{Neap}}$ tide, with moon's $\frac{\text{greatest decl.}}{\text{declination } 0°}$; maximum rate $\frac{1\frac{3}{4} \text{ knots.}}{\frac{1}{2} \text{ knot.}}$ Max. rate $\frac{\text{N.E. by N.}}{\text{S.W. by S.}}$ early January at $\frac{0030}{1230}$ 1st July at $\frac{1230}{0030}$ half an hour earlier each week.
Semi-diurnal stream	Max. rate, ½ knot, $\frac{\text{N.E. by N.}}{\text{S.W. by S.}}$ daily $\frac{1030}{0430}$ after moon's transit.

The maximum rates of the diurnal and semi-diurnal streams may coincide; thus in the East monsoon the maximum rate of the stream setting north-eastward will be about 1¼ knots, and in the West monsoon 2¾ knots. The maximum rate of the stream setting south-westward will be about 3¼ knots in the East monsoon and 1¾ knots in the West monsoon.

Charts 1653a, 941a, 1263.

Chart 2056.

South-eastern side of Sunda strait.—Coast.—Light.—Dangers.—The south-western extremity of Java consists of a peninsula named Oedjoeng Koelon (Ujung Kulon), joined to the main island by a low, narrow, swampy isthmus; this peninsula rises in the south-west to a densely wooded mountainous land, of which Pajoeng (Payung), 1,598 feet (487^{m}1) high, is the summit. On the northern side these mountains descend gradually to Eerste (First) punt (*Lat. 6° 45′ S., Long. 105° 13′ E.*), at the entrance to Behouden passage.

Tanjong Goeha (Guha) Kolak, the south-western extremity of Oedjoeng Koelon, is rendered prominent by a hill, 689 feet (210^{m}0) high, close within the point. Tjangkoeang (Changkuang), 1,273 feet (388^{m}0) high, about 1¼ miles eastward of this hill, is very prominent from eastward and westward.

Two large rocks, above water, lie close off Tanjong Goeha Kolak, with a rock awash outside them. Karang Pabajang, above water, lies about 1½ miles east-south-eastward of Tanjong Goeha Kolak and about 4 cables southward of Tanjong Tjangkoeang (Changkuang); other rocks fringe the coast, the sea breaking heavily over them. The depths are very great close-to, and the coast should not be approached within 2 miles. For the south coast of Java, eastward of Tanjong Tjangkoeang, *see* page 152.

Java head, about 5 miles north-north-westward of Tanjong Goeha Kolak, is a prominent rocky headland separated from the main slope within it by a low tongue of land, and appears from southward as a blunt point with a small flat-topped hill inside and a rock outside.

When making the head in hazy weather, the appearance of the land eastward of Tanjong Goeha Kolak, between it and Tanjong Sodong, 18 miles eastward, bears much resemblance to that of the west point of Java, with the adjacent hills on Prinsen eiland; and the low land in such circumstances not being distinguishable at a distance, the position of it has been mistaken for the entrance to Behouden passage. *See* view on chart 2056, and views facing this page.

Several rocks, above and below water, lie within half a mile of the coast between Tanjong Goeha Kolak and Java head, and there is always surf over them.

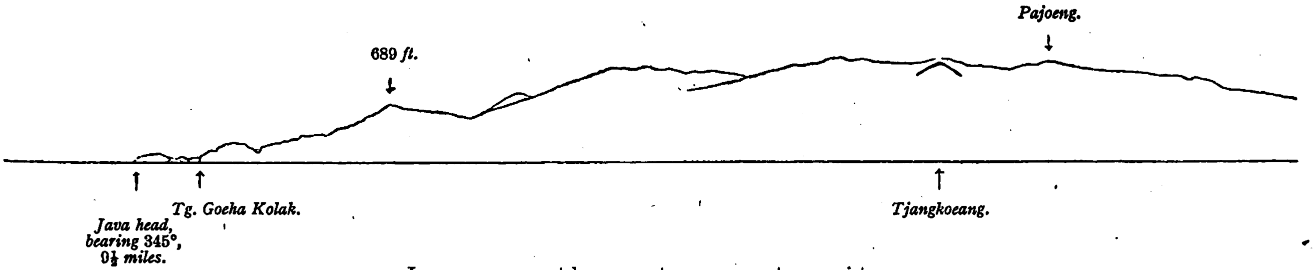
Eerste punt (First point), the southern entrance point of the southern end of Behouden passage, is a low rocky point with some high trees and shrubs on it; farther inland it is thickly wooded. Some rocks above and below water lie close off the point, including Monnik rots.

A light is exhibited, at an elevation of 163 feet (49^{m}7), from a white iron framework structure, 65 feet (19^{m}8) in height, on Eerste punt.

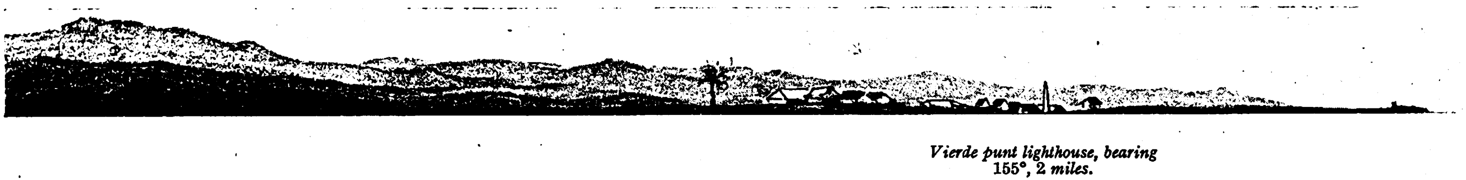
Meeuwen (Mew) baai is entered between Eerste punt and Tanjong Senini, a broad, wooded point with a prominent beach, 8½ miles north-eastward; the shore of the bay is low, densely wooded, uninhabited, and fringed by a narrow coral reef. Meeuwen (Mew) eiland, in the southern part of the bay, 256 feet (78^{m}0) high, is thickly wooded and fringed by a narrow coral reef, with three rocks lying on it off Tanjong Tjopong (Chopong), the north-western point, which is steep; there is a narrow passage between the island and the main coast, but a reef lies in the northern part. Small vessels with local knowledge may obtain good anchorage in this passage. Meeuwen steenen (Mew stones).

Charts 941a, 1263.

To face page 44.

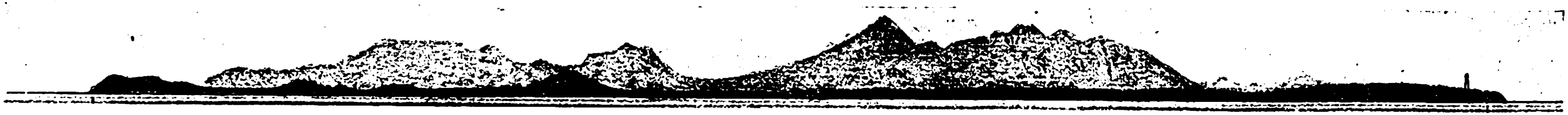


Java, south-western extremity.
(*Original dated* 1929.)

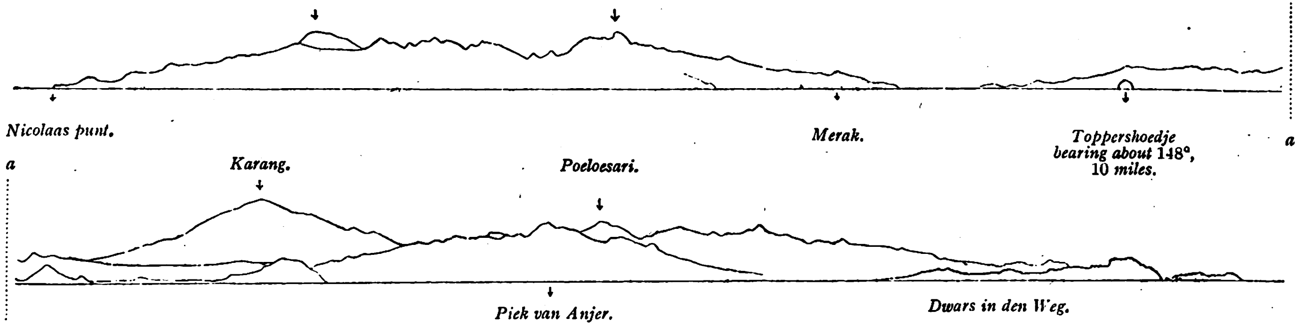

Vierde punt lighthouse, bearing 155°, 2 *miles.*

Java, west coast.
(*Original dated* 1902.)

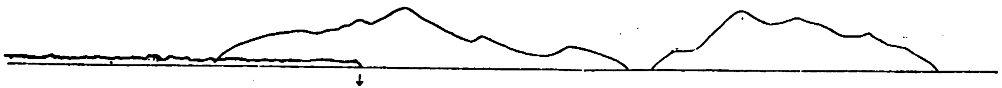
To face page 45.



Java, west coast between Tanjong Leneng and Vierde punt.
(Original dated 1902.)



View, in two parts, of west coast of Java, southward of St. Nicolaas punt.
(Original dated 1929.)



Sumatra, south coast. Taboean from south-westward.
(Original dated 1929.)

Chart 2056.

are a couple of rocks above water about one mile eastward of Eerste punt and about 1½ cables offshore.

Landing can be effected in Meeuwen baai on the sandy beach in Meeuwen baai, although this is rendered somewhat difficult by the almost continuous surf and the numerous rocks on the drying coastal reef.

Tweede (Second) punt, the low, wooded northern extremity of Oedjoeng Koelon and nearly 3 miles north-eastward of Tanjong Senini, has a noticeable patch of sand on its outer end.

Prinsen eiland.—Anchorages.—Prinsen (Princes) eiland, the largest island in Sunda strait, is hilly and densely wooded except in the south-western part; it is uninhabited. The highest peak, named Raksa (*Lat. 6° 36′ S., Long. 105° 15′ E.*), near the eastern coast, is 1,050 feet (320^{m}0) high, and Parat, a hill, near the north-eastern extremity, is 614 feet (187^{m}1) high; a long spur extends south-westward from this hill, rising to the prominent hill Darahajoe (Darahayu), near the north-western coast. Tanjong Waton and Tanjong Sabini, forming the south-western extremity of the island, are fringed by extensive reefs, with some sandbanks and rocks above water, which extend about half a mile southward from these points. A rock, which dries, lies about 8 cables south-south-eastward of Tanjong Sabini.

Kasuaris baai, on the south-western side of the island, is entered between Tanjong Sabini and Tanjong Karangboeroeng (Karangburung), about 3¼ miles south-eastward; the inner part has convenient depths for anchoring, but is entirely open to the heavy southerly swell; small vessels may obtain sheltered anchorage northward of the coastal reef extending from Tanjong Tjidarahajoe (Chidarahayu), on the eastern side of the bay and about 3½ miles northward of Tanjong Karangboeroeng, where landing can also be effected. A 2¾-fathom (5^{m}0) shoal lies about half a mile north-westward of this point.

In the east monsoon, anchorage may be obtained in Legon Kadam, on the northern side of the island; both entrance points of this bay are named Tanjong Kadam, and a lagoon penetrates far inland within the eastern point. The inhabitants of Laboehan (page 47), on the Java coast, come here to fish during the east monsoon.

There is good anchorage, during the west monsoon, in Legon Pamageran, on the eastern side of the island and about 1½ miles southward of Tanjong Parat, the northern extremity of the island, in a depth of 13 fathoms (23^{m}8), with Parat heuvel bearing 288°, and Raksa, 205°; this berth is about 1½ cables from the coastal reef, through which a channel, with depths of about 7 fathoms (12^{m}8), leads to the beach in the direction of Parat heuvel.

Behouden passage.—Behouden passage, between the north-western side of Oedjoeng Koelon and Prinsen eiland, is free of dangers, but the Prinsen eiland shore should not be approached within one mile on account of Karangdjadjar (Karangjajar) eilanden, off Tanjong Karangdjadjar (Karangjajar) the southern extremity of the island, and the extensive coastal reef southward of Legon Semadang, about 2¾ miles north-eastward of Tanjong Karangdjadjar; these dangers are always marked by surf.

Welkomst baai.—Dangers.—Welkomst baai is entered between Tweede punt and Tanjong Palagan, 12 miles eastward; the beach at its head is only separated from the south coast of Java by a low

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neck less than one mile wide. In the fairway of the entrance to the bay are depths of from 23 to 25 fathoms ($42^{m}1$ to $45^{m}7$), decreasing gradually to 8 fathoms ($14^{m}6$) eastward of the Handeuleum (Handölöm) eilanden and to 2 fathoms ($3^{m}7$) near the head.

In the west monsoon the whole of the western and southern shores of the bay are marshy; the eastern shore consists largely of sandy beaches. The inner part of the bay is named Lorogan Tjilintang (Chilintang).

Panter riffen, with a least depth of 1½ fathoms ($2^{m}7$) over them, lie nearly in the middle of the entrance of the bay and about 5½ miles eastward of Tweede punt; they are marked by discoloration. A reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies about 4 miles east-south-eastward of Tweede punt and midway between Panter riffen and the western shore of the bay. Batu Kapoer Baroe (Kapur Baru), with a depth of 2¾ fathoms ($5^{m}0$) over it, lies 1¼ miles westward of Badoel (*see* below), and there are several reefs within a distance of about 1½ miles southward and south-westward of this islet.

Handeuleum eilanden are two thickly wooded islets lying about half a mile north-eastward of Tanjong Kalong (*Lat.* 6° 46′ *S., Long.* 105° 25′ *E.*), on the western side of the bay and 7½ miles south-south-eastward of Tweede punt; a rock, which dries, lies about 8 cables north-eastward of the eastern islet. Badoel (Badul), an islet, lies 1½ miles northward of Tanjong Tantjang (Tanchang) Pare, on the eastern shore and about 5 miles south-westward of Tanjong Palagan; Mangir is an islet lying about a quarter of a mile off Tanjong Tangkil, situated about 4½ miles north-eastward of Tanjong Tantjang Pare; Soemoer (Sumur) is an islet connected to the coast close northward of Tanjong Palagan by a reef with little water over it; Oar and Oemang (Umang) are two islets lying close northward of Soemoer. Except Pamagangan, which is a bare patch of sand at the head of the bay, all the islets are thickly wooded, uninhabited, and fringed by reefs.

There is good holding ground in Welkomst baai, but the anchorage is only moderately good, as there is a turbulent sea in the east monsoon, and also in the west monsoon when the wind is at all northward.

Coast.—Between Tanjong Palagan and Tanjong Tjamara (Chamara), 5 miles north-eastward, the coast is low; thence to Derde (Third) punt, about 8½ miles north-north-eastward, it is rocky in places; close inland are several hills, including Batu Hideung (Hidöng), 900 feet ($274^{m}3$) high, about 4 miles south-south-westward of Derde punt, and thence the land becomes lower and flatter in the vicinity of Derde punt. A spur running northward from Batu Hideung terminates near the coast in a very prominent hill named Batu Tjawar (Chawar), situated about 3 miles south-westward of Derde punt. Along the whole of this part of the coast there are numerous patches of cultivated land and coconut plantations. A few streams discharge into the sea, the largest being the Tjidjaralong (Chicharalang), which flows out 3¼ miles north-eastward of Tanjong Palagan. Soemoer (Sumur) village, is situated near Tanjong Palagan, and Tjamara (Chamara) village close north-eastward of Tanjong Tjamara.

Derde punt (*Lat.* 6° 28′ *S., Long.* 105° 40′ *E.*) is a low, wooded point with a sandy beach; it has a hillock, 46 feet ($14^{m}0$) high, on it.

Peper baai.—Dangers.—Peper baai is entered between Derde punt and Popolé, a low, sandy islet covered with vegetation, about

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Chart 2056.

9½ miles north-eastward and about three-quarters of a mile offshore. In the south-western part of the bay the hills run down to the coast, but elsewhere there is a broad strip of low land, reaching its greatest width near the Tjiboengoer (Chibungur), the mouth of which lies 8½ miles eastward of Derde punt. Several rivers flow into the bay, the Tjiliman (Chiliman), about one mile south-westward of the Tjiboengoer (*Lat. 6° 28′ S., Long. 105° 49′ E.*), being the principal. Only here and there, near the southern shore of the bay, are a few native dwellings; the remainder of the coast is uninhabited.

Pasir Goendoel (Gundul), about 1½ miles eastward of Derde punt, is a coral bank mostly above water, and visible from a considerable distance owing to its white appearance. Liwoengan (Liwungan), a low, wooded islet, about 3¼ miles east-south-eastward of Derde punt, is fringed by a reef; a detached sandbank, which partly dries, lies about 3 cables north-westward of it, and is usually marked by surf. Gusong Pandjang (Panjang), about 1¼ miles south-westward of Popolé, has a least depth of 7 feet ($2^{m}1$) over it, and, being steep-to, is dangerous, as the sea does not often break on it, although it can generally be distinguished by discoloration. A rock, which dries, lies 2¾ miles south-south-westward of Popolé and about 1¾ miles offshore, with a 3-foot ($0^{m}9$) patch about 2½ cables eastward of it. A shoal, with a depth of 5 feet ($1^{m}5$) over it, lies one mile farther south-south-westward.

Peper baai affords safe anchorage in the east monsoon, but is unsuitable in the west monsoon. The bottom consists of mud within the 10-fathom ($18^{m}3$) line.

Reede Laboehan.—Lights.—Dangers.—Laboehan (Labuhan) is an unimportant settlement, consisting mainly of Chinese, situated near the mouth of the Tjipoetanagoeng (Chiputanagung), which flows out about 11 miles east-north-eastward of Derde punt. It is connected by rail with Batavia. There is a stone dam on the northern side of the entrance to Tjipoetanagoeng; praus can only pass in and out of the river at high water, and a blue flag is displayed if conditions are unfavourable.

A light is exhibited, at an elevation of 23 feet ($7^{m}0$), from an iron column on the southern entrance point of the Tjipoetanagoeng. A light is also exhibited on the northern side of the entrance to the river.

The roadstead is bounded by the parallels of 6° 22′ S. and 6° 23·5′ S. and by the meridian of 105° 48′ E.

A shoal, with a depth of 1¾ fathoms ($3^{m}2$) over it, lies about one mile westward of the mouth. Karang Keboea (Kebua), about 2 miles northward of Popolé, and about half a mile offshore, is a coral reef with a sandbank on it, marked by breakers; a rock, with a depth of 5 feet ($1^{m}5$) over it, lies between Karang Keboea and the coast.

Coast.—Lights.—Northward of Tjaringin (Charingin), a small village 1½ miles northward of Laboehan, the hitherto low coastland rapidly narrows, and the wooded slopes of the mountainous land approach close to the coast. Telok Tjarita (Charita) is entered between Tanjong Gelebeg, about 3¾ miles northward of Laboehan light-structure, and Tanjong Katapang, a rocky point about 1¼ miles farther northward; some rocks above water lie close off the latter point. Eastward of the bay are the prominent mountains Poeloesari (Pulasari), 4,412 feet ($1{,}344^{m}8$) high, and Aseupan (Asöpan), 3,806 feet ($1{,}160^{m}0$) high, lying 9 miles eastward and 6 miles east-north-eastward,

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Chart 2056.

respectively, of Tanjong Gelebeg (*Lat. 6° 19′ S., Long. 105° 50′ E.*); about 7½ miles east-north-eastward of Aseupan is Karang, 5,824 feet (1,775^{m}1) high, with its triple peaks.

A light is exhibited, at an elevation of 26 feet (7^{m}9), from an iron column, near the beach in Telok Tjarita.

Rots hoek, 7½ miles northward of Tanjong Katapang, is prominent on account of a rock on it, and a hillock on the coast close northward of it.

At some places along the coast are high sloping sandy beaches, where landing can generally be easily effected; such is the case by the mouth of Pasang Tenang, 2 miles northward of Rots hoek, which is sheltered on the northern side by a coral reef. The mouth of this river may be identified by an isolated rock, named Batu Saoen. Northward of Pasang Tenang there is a bank along the coast, consisting of clay and sand, which affords good anchorage.

Eastward of Pasang Tenang a number of peaks rise close together; the highest of these is Gedé, 2,428 feet (740^{m}0) high, 5½ miles east-north-eastward of Rots hoek and the northernmost Pabeasan, 1,936 feet (590^{m}1) high, with a cone-shaped summit; Merak, the westernmost, is 1,773 feet (539^{m}5) high, and also cone-shaped, with two peaks.

Catharina rotsen (Catherine rocks) are two rocks above water, surrounded by a reef, lying about 7 cables west-south-westward of the mouth of Pasang Tenang; they are visible from a distance of about 3 miles; several reefs lie within about 3½ cables northward and north-eastward of them.

A submarine cable passes northward of Catharina rotsen and is landed near the mouth of Pasang Tenang; anchorage is prohibited in its vicinity.

Vierde punt (Fourth point), about 4 miles north-north-eastward of the mouth of Pasang Tenang, is low and overgrown with brushwood, but may be identified by the lighthouse on it. Anjer Kidoel (Anyer Kidül) village is situated near the point; it is connected to Batavia by rail, and to the general telegraph system. The best anchorage is southward of the point, on the sand and clay coastal bank between it and Catharina rotsen with good holding ground, but off Vierde punt the holding ground is bad. *See* view facing page 44.

A light is exhibited, at an elevation of 178 feet (54^{m}2), from a white iron tower, 190 feet (57^{m}9), in height, on Vierde punt.

Anjer (Anyer) Lor village, about 2½ miles north-eastward of Vierde punt, may be identified by a hill, 197 feet (60^{m}0) high, near the coast northward. It is connected to the general railway and telegraph systems of the island.

A light is exhibited from a wooden post, on the seaward end of a stone pier on the southern side of the channel leading to Muara Pakoe (Paku), which flows out close northward of Anjer Lor.

Anchorages.—Anchorage off Anjer Lor village is not easily found, but it can be approached by bearings of the summit of Dwars in deg weg (page 51), which is visible here in the haziest weather in the east monsoon, and of the lighthouse on Vierde punt (*Lat. 6° 04′ S., Long. 105° 53′ E.*).

There is good anchorage in the east monsoon, in a depth of 12 fathoms (21^{m}9), 3 cables from the drying coastal reef, with the lighthouse on Vierde punt bearing 230°, and the summit of Dwars in deg weg,

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320°. Small vessels can anchor, in a depth of from 4 to 5 fathoms (7^{m}3 to 9^{m}1), in an inlet near Anjer Lor during the east monsoon. This inlet was formed by the eruption of Krakatoa, and even as far out as a depth of 2 fathoms (3^{m}7) the remains of houses and trees are to be found; although it provides shelter it is dangerous owing to sunken rocks and heavy breakers.

Reede Anjer Lor is bounded by the meridian of Brabandshoedje (*see* below), and by a line drawn in a 223° direction from Brabandshoedje to meet a line drawn in a 315° direction from a position on the coast 5½ cables north-eastward of Vierde punt lighthouse.

Aspect.—Within Vierde punt there is a plain between the coast and the hills; near Tanjong Leneng, about 4½ miles north-eastward of Vierde punt, the coast is rocky, and there are two hills, about 130 feet (39^{m}6) high. The plain is broken by the Marengmang gebergte, 886 feet (270^{m}0) high at its south-eastern end, stretching in a north-north-westerly direction to Tanjong Leneng. About 2 miles eastward of the range is Mokol, 722 feet (220^{m}1) high, with a truncated cone.

The plain northward of Marengmang gebergte becomes narrower towards Merak (page 50); cultivated areas stretch close to the coast, which is everywhere overgrown with brushwood. Northward of the plain is the St. Nicolaas gebergte, which extends to the point of that name. The highest peaks of this range most easily identified are Gedé and Batoer (Batur), 1,949 and 1,814 feet (594^{m}1 and 552^{m}9) high, respectively. Gedé has a flat summit, and is visible as far northward as the Gebroeders (page 69) in clear weather; Batoer has a rocky sharp summit. *See* views facing page 45.

Northward of Merak besar some high wooded points give the coast a strange appearance; they drop sheer into the sea, and terminate in a coral reef about half a cable wide; there are sandy beaches between the points, which afford landing; several streams find their outlet here, but they are choked during the easterly monsoon.

Coast.—Dangers.—Tanjong Leneng is rocky and fringed by a narrow reef. A reef, with a depth of 2½ fathoms (4^{m}6) over it, lies 2 cables northward of the point, and is not easily distinguished.

Outside the 5-fathom (9^{m}1) line the depths increase regularly, rapidly near Vierde punt, but more gradually farther north-eastward. The 5-fathom (9^{m}1) line extends half a cable beyond Tamposo (page 50). Depths of 25 fathoms (45^{m}7) are found about one mile offshore here, deepening off St. Nicolaas punt.

Brabandshoedje, 154 feet (46^{m}9) high, is a rock covered with vegetation, which rises steeply from depths of about 20 fathoms (36^{m}6), and may be closely approached on all sides. The channel between Brabandshoedje and Tanjong Leneng (*Lat. 6° 01′ S., Long. 105° 57′ E.*) is clear except for the reef described above. Pinang, a hill, 853 feet (260^{m}0) high, about 10 miles east-south-eastward of Tanjong Leneng, is a prominent object seen over the low undulating land from here.

Brouwers sand consists of a bank of hard sand running parallel with the coast, at a distance of 1½ miles from it, southward of Merak eiland; 2¾ fathoms (5^{m}0), the least depth, lies near the north-eastern extremity. On the outer side of the bank the depths increase rapidly from 16 to 20 fathoms (29^{m}3 to 36^{m}6), hard ground, and on the inner side from 10 to 14 fathoms (18^{m}3 to 25^{m}6), mud and sand, and sand

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Chart 2056.

and coral. Vierde punt, bearing about 212°, open north-westward of Brabandshoedje, leads north-westward of Brouwers sand.

Keroengo (Kerungo), a coral reef which dries, lies about 2 cables offshore and 4 miles north-eastward of Tanjong Leneng.

Chart 2056, plan of Merak road.

Reede Merak.—Dangers.—Beacons.—Buoys.—Merak besar, a wooded island, 216 feet ($65^{m}8$) high, 5½ miles north-eastward of Brabandshoedje, is fringed by a narrow coral reef, which is steep-to on its north-western side. Merak kechil, 4½ cables south-eastward of Merak besar and about 1½ cables offshore, is a low islet.

Taremboe (Tarembu), a rock which dries, lies in the middle of the western side of an extensive reef, with depths of less than 5 fathoms ($9^{m}1$) over it, lying between Merak besar and Merak kechil. A 2¾-fathom ($5^{m}0$) patch lies about one cable northward of Taremboe, and a patch, with a depth of 3 fathoms ($5^{m}5$) over it, eastward of it.

Reede Merak is bounded by a line drawn in an 045° direction from the northern extremity of Merak besar to the coast, and by the parallel of the southern extremity of Merak besar.

The western side of the channel between Merak besar and Taremboe is marked by a beacon, surmounted by a black truncated cone, on the edge of the coastal reef on the eastern side of Merak besar; the eastern side is marked by a beacon, surmounted by a white ball, near the western side of Taremboe, and a white conical buoy close westward of the 2¾-fathom ($5^{m}0$) patch northward of the rock.

The western side of the channel between Taremboe and Merak kechil (*Lat. 5° 56′ S., Long. 106° 00′ E.*) is marked by a black can buoy off the eastern edge of the 3-fathom ($5^{m}5$) patch on Taremboe reef; the eastern side is marked by a beacon on the edge of the reef extending about half a cable from the western side of Merak kechil.

The strait between Merak besar and the coast affords the only sheltered anchorage on the west coast of Java; there is practically no swell there, as Taremboe and Merak besar act as breakwaters. The maximum rate of the stream is not more than 2 knots. Vessels may enter from southward, passing on either side of Taremboe, as there are depths of from 5 to 8 fathoms ($9^{m}1$ to $14^{m}6$) in both channels; there is usually a south-going current in the strait. The channel northward of Merak besar is narrowed by a bank extending about three-quarters of a cable from that island, and there is a 4¼-fathom ($7^{m}8$) patch nearly in mid-channel.

There is a pier, sheltered from the swell, on the Java shore north-eastward of Merak besar, near Poelomerak (Pulomerak) village.

Communication.—There is regular steamer communication between Poelomerak and Oosthaven (page 61), thus connecting Batavia with Sumatra, as Poelomerak is connected to Batavia by rail; it is also connected to the general telegraph system.

Chart 2056.

Coast.—Danger.—The coast between Poelomerak and St. Nicolaas punt (*Lat. 5° 53′ S., Long. 106° 03′ E.*), 4¼ miles north-eastward, is high and broken by steep points; it is fringed by a coral reef half a cable wide, with numerous rocks above water. Tamposo is an islet lying near the edge of the coastal reef about midway along this portion of the coast, and, as it is almost entirely bare, is difficult to distinguish; praus and small craft find good shelter in the narrow channel between

Chart 2056.

the islet and the coast, where there are depths of from 2 to 5 fathoms ($3^{m}7$ to $9^{m}1$). St. Nicolaas punt, the north-western extremity of Java, is a narrow tongue of land, 43 feet ($13^{m}1$) high, and, when clear of the high land behind, can be seen from a considerable distance ; northward of the point the depths increase rapidly, the bottom being hard ground and sand close inshore, and sand, stones and shells farther northward. For the north coast of Java eastward of St. Nicolaas punt *see* page 72.

Java rif, a small coral patch, with a depth of 4¾ fathoms ($8^{m}7$) over it, lies about one mile northward of Merak besar and about 6 cables offshore ; when the stream is running from 1 to 2 knots the reef is marked by ripples, and sometimes by discoloured water.

Islands and dangers in northern entrance to Sunda strait.—Light.—Dwars in deg weg, an island in the middle of the narrowest part of Sunda strait, is easily identified, and from a distance appears to consist of several islets. There are some hills along its south-western side, the highest having an elevation of 509 feet ($155^{m}1$) ; on the northern side there is a plain. The north and east coasts are fringed by a narrow reef ; on the south-eastern side the reef projects about 2¾ cables, and is often marked by heavy surf ; from about the middle of the south-western side a reef extends about one cable, otherwise this side is clear. A rock lies close off the western extremity of the island, and also off the southern extremity.

A bank of sand, with depths of from 6 to 20 fathoms ($11^{m}0$ to $36^{m}6$) over it, extends about 7 miles south-westward from the island, and affords good anchoring ground. The south-west-going current, which runs with great force along the north-western and southern sides of the island, causes heavy tide-rips there ; an eddy, which sets very strongly inshore, is then formed in the bay on the south-western side ; the depths in this bay are very irregular.

Stroom klip lies about 2 miles north-north-westward of the western extremity of Dwars in deg weg, is just above water and is always marked by breakers ; there is deep water on all sides at a distance of about 3¼ cables from the rock. Sometimes strong eddies and discoloured water in the vicinity of this rock makes it appear as though it were joined to Dwars in deg weg by a ridge, although such is not the case. A stream, with a rate of 6 knots, has been observed abreast Stroom klip.

Winsor klip, about 4 miles north-eastward of the northern extremity of Dwars in deg weg, has a least depth of 3 fathoms ($5^{m}5$) over it, and is marked by discoloration and tide-rips ; it is steep-to within a distance of a quarter of a cable. The whole of Merak besar open on either side of Toppershoedje will lead close on one side or the other of this danger.

Toppershoedje (*Lat. 5° 54′ S., Long. 105° 56′ E.*), about 5 miles east-north-eastward of Dwars in deg weg, is a steep rock, 230 feet ($70^{m}1$) high, covered with vegetation ; there is deep water at a distance of 3 cables all round. There is a notice-board, marked " Landings—Plaat," on the beach near the south-eastern corner of the island.

A light is exhibited, at an elevation of 251 feet ($76^{m}5$), from a white iron framework structure, 72 feet ($21^{m}9$) in height, on Toppershoedje.

NORTH-WESTERN SIDE OF SUNDA STRAIT.—Coast.—The south coast of Sumatra, which forms the north-western side of Sunda strait, from Vlakke hoek on the west to Varkens hoek on the

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Chart 2056.

east, a distance of 70 miles, consists of three large promontories, between which are Semangka baai and Lampoeng (Lampung) baai.

Of these three promontories the western, known as Benkoelen peninsula, is the lowest; it is traversed almost throughout its length by the Sawah gebergte and terminates in low land southward.

On the central promontory high mountains rise steeply from the sea abreast the Legoendi eilanden (page 56), and extending in a general north-westerly direction, eventually enclose the valley of the Wai Semangka, which, with the Wai Ngarip, flows into the head of Semangka baai, between them and the Sawah gebergte. On the mountain range of the central promontory are several high volcanoes: Tanggang, near the southern extremity, and about 36 miles east-north-eastward of Vlakke hoek, is 3,812 feet (1,161^{m}9) high; Tanggamoes, about 31 miles north-north-eastward of Vlakke hoek, is described on page 43. On the eastern part of the central promontory are Pesawaran, 5,453 feet (1,662^{m}1) high, and Ratai, 5,518 feet (1,681^{m}9) high, lying close to one another, about 12 miles northward of Tanggang. *See* view facing this page.

The eastern promontory is highest in the southern part, where the double-peaked volcano Radja (Raja) Basa, 9½ miles north-westward of Varkens hoek, is 4,203 feet (1,281^{m}1) high, and rises steeply from the sea. *See* also page 60.

The entire south coast of Sumatra is thickly wooded, with villages here and there along the coast.

Off-lying island.—Betoea (Betua), an island, about 6½ miles westward of Vlakke hoek, is low, wooded with high trees, and fringed by a reef, which extends about 6 cables from the north-western and south-eastern ends; this reef is prolonged by a narrow ridge, with depths of less than 10 fathoms (18^{m}3) over it, which extends about 3 miles farther south-eastward.

Anchorage may be obtained, in depths of from 8 to 9 fathoms (14^{m}6 to 16^{m}5), off the north-eastern side of the island, where there is a village.

Coast.—**Light.**—Vlakke hoek is entirely flat and is fringed by a narrow coral reef, outside which the depths increase fairly regularly. Three patches, with depths of from 7 to 10 fathoms (12^{m}8 to 18^{m}3) over them, lie near the 20-fathom (36^{m}6) line, about 5 miles south-westward of the cape.

Approaching Vlakke hoek in thick weather, when the land cannot be seen, the soundings are a good guide, but it is advisable to keep in depths of not less than 20 fathoms (36^{m}6).

A light is exhibited, at an elevation of 205 feet (62^{m}5), from a white iron tower with a dwelling, 190 feet (57^{m}9) in height, on Vlakke hoek.

The coast between Vlakke hoek and Ujong Tjoekoe (Chuku) Redak, a low point 10½ miles eastward, is low in the western part but becomes slightly higher eastward. A reef, with a depth of 5 feet (1^{m}5) over it and marked by breakers, lies about one mile offshore and 2¾ miles east-south-eastward of Ujong Tjoekoe (Chuku) Saleman, a low point 2 miles south-eastward of Vlakke hoek; a patch, with a depth of 4¾ fathoms (8^{m}7) over it, also lies about half a mile south-south-westward of Ujong Tjoekoe Saleman (*Lat. 5° 57′ S., Long. 104° 35′ E.*), otherwise there are no dangers along this part of the coast.

Semangka baai.—Semangka baai, entered between Ujong Tjoekoe

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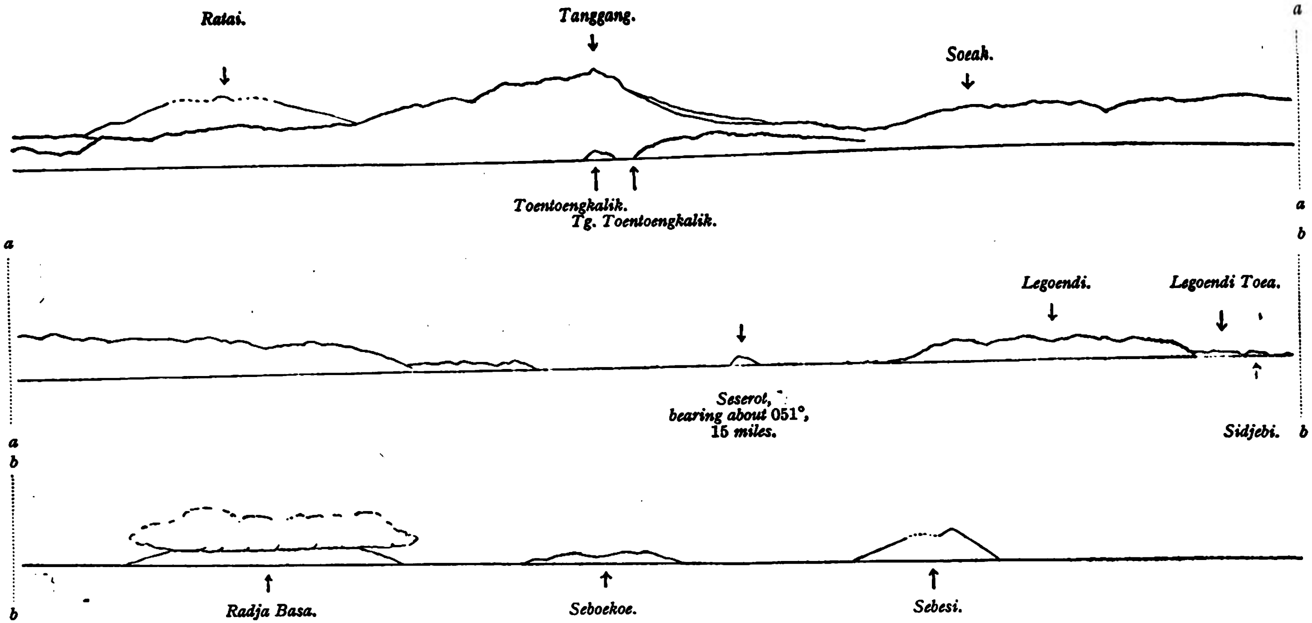
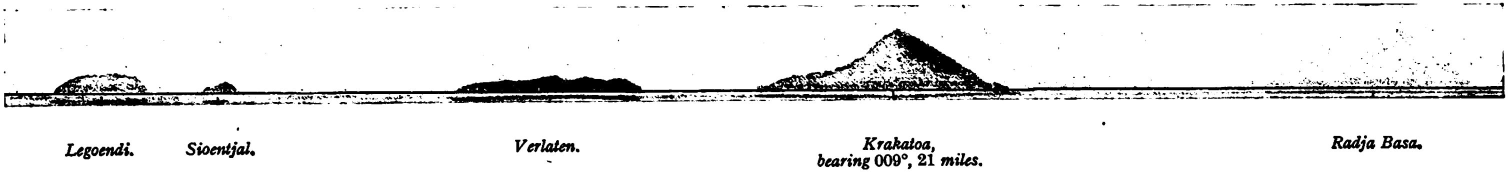
To face page 52.



View, in three parts, of south coast of Sumatra.
(Original dated 1929.)



Islands in Sunda strait.
(Original dated 1902.)

Chart 2056.

Redak and Tanjong Toentoengkalik (Tuntungkalik), 23 miles east-north-eastward, is entirely open to south-easterly winds, and, when these are blowing, only affords anchorage in the northern part. The western shore is steep-to, with depths of from 20 to 30 fathoms ($36^{m}6$ to $54^{m}9$) within half a mile of it; the eastern side is less steep, and affords opportunity for anchoring, as the depths are from 20 to 30 fathoms ($36^{m}6$ to $54^{m}9$) at 2 miles offshore.

Taboean (Tabuan), an island, nearly in the middle of the entrance of the bay, is thickly wooded and steep on all sides, rising to a peak 2,205 feet ($672^{m}1$) high; Tanjong Batoe Keboetjoeng (Batu Kebuchung), its south-eastern extremity, lies 9 miles north-eastward of Ujong Tjoekoe Redak. Except on the northern side it is fringed by a steep-to reef, but on the south-eastern side a ridge, with depths of less than 20 fathoms ($36^{m}6$) over it, extends about 2 miles eastward. There is anchorage on the northern side, off the village Sawang Balak, and on the south-eastern side on the above-mentioned ridge. *See* view facing page 45.

South-western side of Semangka baai.—Anchorages.—Tampang baai, entered between Ujong Tjoekoe Redak and Ujong Tjoekoe Batoe Loenik (Chuku Batu Lunik), 6 miles northward, is entirely open to south-easterly winds, but affords good anchorage, in a depth of 14 fathoms ($25^{m}6$), sand, north-eastward of Tampang village, situated near the head of the bay; the village is difficult to distinguish from seaward, but the coconut trees give some indication of its position; there is a sandy beach along the shore of the bay.

There is anchorage off Kaoergading (Kaurgading) village, about 8 cables northward of Ujong Tjoekoe Batoe Loenik, in a depth of 10 fathoms ($18^{m}3$), about 2 cables offshore, with a house with a zinc roof, bearing 258°. Ujong Goenoeng (Gunung) Dalam is a high point about 7 miles north-north-westward of Ujong Tjoekoe Batoe Loenik; there is anchorage off Karangberak village, on the southern side of the point, in a depth of 18 fathoms ($32^{m}9$), about 2¾ cables offshore. There is good anchorage off Wainipah village, 10 miles north-westward of Ujong Goenoeng Dalam, in a depth of 11 fathoms ($20^{m}1$); a vessel should approach by sounding, with the low point immediately northward of the village bearing about 316°. Coral reefs extend about half a mile offshore between this village and Tanjong Betoeng (Betung), a low point about 2¼ miles north-north-westward.

Betoeng (Betung) village, one of the largest on the western shore of the bay, is situated on the northern side of Tanjong Betoeng, (*Lat. 5° 33′ S., Long. 104° 33′ E.*) and there is anchorage, in a depth of 17 fathoms ($31^{m}1$), about 1½ cables offshore, with the village bearing about 240°; rocks above water and discoloured water extend one cable offshore. Tandjoengan (Tanjungan) village stands just eastward of the southern mouth of the Wai Semangka and about one mile north-westward of Betoeng village; a hard sandbank lies off the northern mouth. There is good anchorage off Tandjoengan, in a depth of 14 fathoms ($25^{m}6$), about 7 cables offshore, with the village bearing about 230°. The land at the head of the bay is low, marshy, and covered with high trees.

Reede Kota Agoeng.—Light.—Anchorage.—Kota Agoeng (Agung), the headquarters of a Government official, is situated on

Charts 1653a, 941a, 1263.

Chart 2056.

the beach at the head of Samangka baai, about 5½ miles north-eastward of Tanjong Betoeng.

A light is exhibited, at an elevation of 28 feet (8^m5), from a white iron framework structure, 26 feet (7^m9) in height, near the root of the pier at Kota Agoeng (*Lat. 5° 30′ S., Long. 104° 37′ E.*).

There is anchorage, in a depth of 5 fathoms (9^m1), mud and sand, with the light-structure bearing 024°, distant nearly half a mile; a 2-foot (0^m6) patch lies about one mile west-south-westward of the light-structure, so it is advisable to steer up to the anchorage on the above bearing.

The coastal reef extends about 1¾ cables from the point situated about 4 cables south-eastward of the light-structure, and shelters the beach fairly well from the south-easterly swell, so that landing can always be effected. In the west monsoon the anchorage is unsuitable for small vessels, which should then anchor off Tandjoengan.

Kota Agoeng is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

North-eastern side of Semangka baai.—Danger.—Eastward of Kota Agoeng the spurs from the mountains approach the coast, which rapidly becomes steep and rocky. In the places where the mountains are intersected by valleys, there are usually bays and villages, although the latter frequently lie some distance inland and are not visible from seaward; usually, however, coconut trees indicate their whereabouts. The coast north-westward of Labuan Tengor, situated about 19 miles south-eastward of Kota Agoeng, may be approached fairly closely, except in the vicinity of Tanjong Balang Besi, 7½ miles east-south-eastward of Kota Agoeng, where a reef, which dries, extends about 2¾ cables, and near the mouth of the Wai Limau, about 5½ miles farther south-eastward, where a rocky bank extends half a mile offshore; south-eastward of Labuan Tengor the coast is fronted by numerous steep rocks and islets. Labuan Tengor is only suitable for small vessels with local knowledge, and does not afford good anchorage, as the swell runs direct into the bay.

There is usually surf along the entire north-eastern shore of Semangka baai, becoming heavier towards Sunda strait, owing to which the atmosphere is very hazy in the mornings, and the coast is very difficult to distinguish. Tanggamoes (page 43), at the head of the bay, the summit of Taboean, which appears sharp from north and south, and the steep, rocky islets Hioe (Hiu) and Toentoengkalik (Tuntungkalik), lying off the bays of Kaloembajan (Kalumbayan) and Kiloean (Kiluan) (page 55), respectively, can always be identified.

A dangerous coral reef, with a depth of 2 fathoms (3^m7) over it, and not marked by discoloration, lies about 1½ miles southward of the mouth of the Wai Limau.

Telok Oembar (Umbar), entered about 4½ miles south-eastward of Labuan Tengor, affords anchorage for small vessels, with local knowledge, although it is exposed to the southerly swell. Two steep, rocky islets, covered with vegetation, lie close offshore westward of the entrance, and some rocks above water lie just within the western entrance point; some rocks, which can be passed close-to, also lie close southward of the eastern entrance point. A vessel should enter the bay in mid-channel. Oembar (Umbar) village stands in the north-eastern corner of the bay.

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Telok Pakoe (Paku), immediately south-eastward of Telok Oembar, is only suitable for praus; there is always a disturbed sea in it, with shelter only near its head. Pakoe, an islet (*Lat. 5° 43′ S., Long. 104° 59′ E.*), in the middle of the entrance, is a useful point of identification; close eastward of this islet is a hollow rock, named "Batu Njerbo" (spouting rock) by the natives, from which water spurts upwards like a fountain when there is a heavy swell, having the appearance of a white sail when seen from a distance.

Telok Kaloembajan, entered about 2 miles south-eastward of Telok Pakoe, can be readily identified by Hioe, a steep, rocky islet, 492 feet (150^{m}0) high, covered with vegetation, which lies 6½ cables south-westward of Tanjong Lagoean, the south-eastern entrance point; about half a mile north-westward of Hioe is Batu Kaboeloeng (Kabulung), and about 3 cables eastward is Batu Kaboe (Kabu). The passages between these three islets and the coast are clear of dangers; if passing through them a vessel should always keep Batu Lagoean, some rocks close westward of Tanjong Lagoean, well on her starboard hand. The villages of Napal and Kaloembajan, at the head of the bay, are not visible from seaward.

A vessel proceeding into Telok Kaloembajan should pass northward of Batu Kaboeloeng, and can obtain anchorage, in a depth of about 9 fathoms (16^{m}5), about 2 cables offshore, in the north-eastern corner of the bay.

Tanjong Baroe (Baru) lies about three-quarters of a mile south-south-eastward of Tanjong Lagoean. Telok Karang Berak and Telok Pegadoengan (Pegadungan), entered about 7 cables and 2¼ miles east-south-eastward, respectively, of Tanjong Baroe, are too exposed to afford anchorage.

Telok Kiloean (Kiluan), on the northern side of Tanjong Toentoengkalik, and about 4½ miles east-south-eastward of Tanjong Baroe, affords, after Telok Kaloembajan, the best anchorage at the entrance to Semangka baai, although there is little room to swing; vessels lie here sheltered from all winds. The steep, rocky islet Toentoengkalik, lying about 2½ cables south-westward of Tanjong Toentoengkalik, the southern entrance point, is a good landmark; Kiloean, an islet, with some large rocks above water extending 5 cables south-westward from its south-western extremity, lies in the middle of the entrance. A coral reef, which dries, extends about 1¼ cables from the northern shore of the bay; a small detached reef, which dries, at the head of the bay, is usually marked by discoloration.

To enter the bay, a vessel should pass southward of the rocks off the south-western extremity of Kiloean, and then steer in mid-channel between that islet and the south-eastern shore of the bay; thence keep close along the steep point eastward of Kiloean eilandje (*Lat. 5° 47′ S., Long. 105° 06′ E.*), and anchor by eye, taking care to give the reef extending from the northern shore of the bay a good berth. There are some houses near the head of the bay, but they are not visible from the anchorage.

Coast.—The coast between Tanjong Toentoengkalik and Tanjong Tikoes (Tikus), 8 miles eastward, is steep, inaccessible, and affords no anchorage; it is fringed by numerous rocks and islets, but these all lie close inshore except the Toedjoeh (Tuju) eilanden, which extend about 6 cables south-westward of Tanjong Berak, situated about

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Chart 2056.

2¼ miles eastward of Tanjong Toetoengkalik, and Batu Belantoeng (Belantung), a steep-to rock which dries, and only occasionally marked by breakers, lying about 4½ cables offshore and nearly one mile south-westward of Tanjong Belantoeng (Belantung), the western entrance point of Peper baai. Belantoeng, a very prominent rocky islet, lies about midway between Batu Belantoeng and the coast.

Peper baai, entered between Tanjong Belantoeng and Tanjong Tikoes, about 1½ miles east-north-eastward, has a noticeable steep group of rocks in the middle, with some others close off its western shore. There is nearly always a turbulent sea in the bay, but when there is little swell landing can be effected in a small cove with a sandy beach northward of Tanjong Belantoeng.

The eastern extremity of the peninsula separating Semangka baai and Lampoeng baai is named Ujong Tjoekoe Tjapah (Chuku Chapah).

Legoendi eilanden.—Dangers.—Anchorages.—Legoendi (Legundi) eilanden, on the western side of the entrance to Lampoeng baai, consist of six islands, named Legoendi, Seserot, Oenang Oenang (Unang), Legoendi Toea (Legundi Tua), Sioentjal (Siunchal), and Sidjebi (Sijebi). They are all densely wooded and hilly, and are mostly fringed by very narrow reefs, which are very steep-to on their southern sides. The straits between the various islands are not recommended for large vessels. *See* views facing page 52.

Legoendi, the largest of the group, is 1,125 feet ($342^{m}9$) high. Two prominent rocks, covered with vegetation, lie within 2½ cables south-westward of Ujong Pamoetjoekan (Pamuchukan), the south-western extremity of the island. There are two bays on the northern side of the island, which afford very good anchorage, entirely sheltered from westerly and south-easterly winds. Labuan Agoeng, the western of these, is clear of dangers, and its western entrance point lies about 1½ miles north-eastward of Ujong Pamoetjoekan; vessels can anchor about 1¾ cables offshore, with the south-western entrance point in line with the south-western extremity of Seserot, bearing about 331°; there is a small village at the head of the bay. The north-eastern entrance point of Labuan Agoeng forms the western entrance point of Labuan Kramat, the eastern bay, which is somewhat narrow, whilst the space is further restricted by the rocky islet Pertapaän, partly planted with coconut trees and lying in the middle of the bay. Oenang Oenang, also partly wooded with coconut trees, lies off the entrance to the bay and about three-quarters of a mile west-south-westward of Ujong Tjoekoe Tiram (*Lat. 5° 48′ S., Long. 105° 18′ E.*), the northern extremity of Legoendi; it is fringed by a reef, extending about one cable from its eastern side, and there are some rocks close off its south-western extremity. Two reefs, with depths of 10 and 5 feet ($3^{m}0$ and $1^{m}5$) over them, respectively, lie about 1¾ and 3 cables southward of Oenang Oenang; a 5-fathom ($9^{m}1$) patch lies between the southern of these two reefs and the western entrance point of Labuan Kramat. Making for the anchorage, a vessel should steer for Pertapaän, bearing 146° until past the western entrance point where the bay is well open; thence in mid-channel westward of Pertapaän, anchoring in a depth of about 9 fathoms ($16^{m}5$), about 1½ cables from the coastal reef, with the western side of Pertapaän in line with the eastern side of Oenang Oenang, bearing about 011°. The anchorage can also be reached by passing eastward of Oenang Oenang, bearing in

Charts 1653a, 941a, 1263.

Chart 2056.

mind that the coastal reef extends about one cable eastward from Oenang Oenang, and the same distance north-eastward from Pertapaän. There is a small village at the head of the bay. There is also anchorage off the east coast of Legoendi, in Straat Sioentjal (Siunchal) (*see* below), close northward of the steep rock Higo (*see* below); there are some huts abreast this anchorage.

Sioentjal, the next island eastward of Legoendi, is 459 feet ($139^{m}9$) high at its southern end, and almost entirely covered with coconut trees. During the west monsoon there is safe anchorage in Telok Kedah, a bight on the east coast, keeping at least 1¼ cables offshore; a reef, which dries, lies about half a cable offshore southward of the northern entrance point of the bight; this point is situated about 7 cables south-south-eastward of Kapala Sioentjal (Siunchal), an islet close off the northern extremity of Sioentjal. There is a village where fowls, eggs, and bananas can be obtained.

Straat Legoendi.—Danger.—Straat Legoendi (Legundi), between the Sumatra coast and Legoendi eiland, is deep and clear of dangers; it is frequently used by vessels from westward, bound for Oosthaven, at the head of Lampoeng baai. The high, steep islet Seserot, lying in the middle of the strait, can be passed on either side; a rock, which dries, lies about 1½ cables southward of the south-western extremity. The tidal streams are weak, setting north-eastward with the rising water, and south-westward with the falling water. There is usually a south-easterly swell.

Medusa, a reef, with a least depth of 2¾ fathoms ($5^{m}0$) over it, lies off the north-eastern entrance to Straat Legoendi and about 2 miles north-eastward of Seserot; it is sometimes marked by discoloration and usually by ripples, but it never breaks.

Straat Sioentjal.—Straat Sidjebi.—Straat Sioentjal (Siunchal), between Legoendi and Sioentjal, is deep and clear of dangers. Legoendi Toea, a steep, high island entirely covered with vegetation, lies off the southern entrance and 3 cables south-eastward of the south-western extremity of Sioentjal, and may be approached closely everywhere; a steep rock lies at the northern end of the passage between Legoendi Toea and Sioentjal, and may be passed closely on either side. Higo, an islet connected to the eastern side of Legoendi by a reef, about 1½ miles south-eastward of the northern extremity, is steep, high, and covered with vegetation, and can be approached close-to. Batu Karbau, just above water, with the upper part white with seabirds' droppings, lies off the southern entrance to the strait and about three-quarters of a mile south-eastward of Legoendi Toea; it is steep-to, with great depths around. In Straat Sioentjal the stream sets in the direction of the strait, the maximum rate observed was 1½ knots.

Straat Sidjebi, between Sioentjal and Sidjebi, about 4 cables eastward of its southern end, is only suitable for small vessels with local knowledge; there are several rocks which dry in this strait. Sidjebi, 354 feet ($107^{m}9$) high, is almost entirely covered with coconut trees, and there are some huts on the eastern side. The southern part of the island is the highest; the northern part terminates in a narrow, sandy tongue of land.

Serdang.—Serdang (*Lat. 5° 49′ S., Long. 105° 24′ E.*), about 2¾ miles eastward of Sidjebi, with a clear channel between, is a high,

Charts 1653a, 941a, 1263.

Chart 2056.

steep rock covered with brushwood; a sunken rock lies near its north-western extremity.

LAMPOENG BAAI.—Lampoeng (Lampung) baai is entered between Tanjong Tikoes and Tanjong Kelapa, about 23 miles eastward. Tanggang, a mountain about 8½ miles north-westward of Tanjong Tikoes, and Ratai, about 12 miles northward of Tanggang, are described on page 52; spurs from these mountains descend to the coast, forming a number of bays with many good anchorages, although there are numerous dangers. The western shore is marshy in places, and there are some fairly large villages, though these are seldom visible from seaward; the eastern shore is generally high and steep-to. Wai Ratai (page 59), which flows into Ratai baai, on the western shore, is the largest river, but none of them is of any importance to shipping. *See* view facing page 52.

Western side of Lampoeng baai.—Besides Tanggang and Ratai, mentioned above, the following on the western side of the bay are noticeable from seaward:—Dandar, a hill, 564 feet (171^{m}9) high, situated on the northern side of Ratai baai and about 12½ miles northward of Tanjong Tikoes; and the summits of the islands Poehawang (Puhawang), Kelagian, Tegal, and Tangkil, which all lie close off the western shore, in addition to the Legoendi eilanden.

Pedada baai is entered between Ujong Tjoekoe Tjapah (page 56) and the southern extremity of Ujong Tjoekoe Tjambai (Chuku Chambai), about 3 miles northward, and affords good anchorage. A rock, which dries and is marked by breakers, lies about one cable northward of the northern extremity of Ujong Tjoekoe Tjapah. Off Ujong Tjoekoe Tjambai are the islands Tandjoeng Poetoes (Tanjong Putus), Lalangga Balak, and Lalangga Loenik (Lunik), partly or entirely planted with coconut trees; some rocks above and below water lie within half a mile eastward of the eastern extremity of Lalangga Balak, and some rocks above water extend about 2 cables westward from the same island. Tandjoeng Poetoes is separated from the main coast by a narrow channel, with a least depth of 3¾ fathoms (6^{m}9) in it. Lalangga Loenik lies about 1½ miles eastward of the eastern extremity of Ujong Tjoekoe Tjambai.

The islets Balak, 266 feet (81^{m}1) high, Lok, and Loenik (Lunik), also planted with coconut trees, lie in the western part of the bay.

The small rivers Bawang and Pedada, on which are the villages of Bawang and Djawa (Jawa), respectively, flow into this part of the bay.

There are several detached reefs in the bay, all marked by discoloration, the northern part being especially foul. A reef, with a depth of 1½ fathoms (2^{m}7) over it, lies in the middle of the entrance and about 1½ miles eastward of Balak.

There is confined, but very excellent, anchorage in Telok Pagar, on the western side of Ujong Pengrangan (*Lat. 5° 46′ S., Long. 105° 12′ E.*), on the southern side of the entrance to Pedada baai; two rocks above water lie close northward of this point, and can be passed close to; the coastal reef projects about one cable from the western shore of Telok Pagar. There is also good anchorage about 1½ miles farther westward in Telok Benoeangan (Benuangan); a small detached reef lies in the south-eastern corner of this bay, and the coastal reef extends about 3½ cables northward from the south-western side. Anchorage

Charts 1653a, 941a, 1263.

Chart 2056.

can be obtained anywhere westward of Balak, and also in the northern part of Pedada baai, although, as previously mentioned, there are a number of reefs in this part. These anchorages should only be used by vessels with local knowledge.

Poehawang, which has a very prominent steep summit, 797 feet ($242^{m}9$) high, in the north-eastern part, lies about 1¾ miles northward of the eastern extremity of Ujong Tjoekoe Tjambai. Poehawang village stands on the northern side of the island. Poehawang Loenik (Puhawang Lunik) is connected to the eastern side of Poehawang (*Lat. 5° 41′ S., Long. 105° 13′ E.*) by a reef which dries.

Poendoeh (Punduh) baai, westward of Poehawang, has a marshy coast. Wai Poendoeh flows into the southern part of the bay, and has formed a continually increasing mudbank off its mouth; there are several villages on the river, and these are connected to the bay by a wide road. A shed stands where this road meets the coast.

There is anchorage, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), about 2¾ cables north-eastward of the shed, and, although somewhat hot it is free from mosquitoes; a reef, which dries, and always plainly marked by discoloration, lies east-south-eastward of the anchorage. As the passage southward of Poehawang is full of dangers, this anchorage should be approached by the passage northward of that island, which is easy to navigate by vessels with local knowledge; a reef, with a depth of 1¼ fathoms ($2^{m}3$) over it, lies in the northern entrance of this channel, about half a mile north-north-westward of the northern extremity of Poehawang, and a reef, with a depth of 2 feet ($0^{m}6$) over it, and always marked by discoloration, lies close off the north-western side of the same island.

Off-lying danger.—A sandbank, which dries, with depths of 13 fathoms ($23^{m}8$) close around it, lies about 1¾ miles north-eastward of Poehawang Loenik; it is always marked by ripples at high water.

Ratai baai.—Dangers.—Ratai baai, just northward of Poendoeh baai, is the largest and most important of the bays on the western side of Lampoeng baai. Kelagian is an island lying 6 cables north-eastward of the southern entrance point, and there is a clear channel into the bay on either side of it. A small islet, with a reef, which dries, extending about one cable from its eastern side, lies close off the southern side of Kelagian; a reef, with a depth of 1½ fathoms ($2^{m}7$) over it, lies about 1¾ cables off the south-eastern extremity of the same island. In the bay itself there are no dangers except Gosong Mawing, two reefs, which dry, which lie within half a mile of the north-western extremity of Kelagian, and which are always marked by discoloration. Maitem, an islet, about 1¾ miles north-eastward of the northern extremity of Kelagian, lies off Ujong Tjoekoe Tjentiga, the northern entrance point of the bay; there is a passage for praus between this islet and the coast, but a pinnacle rock, with a depth of 3 feet ($0^{m}9$) over it, lies in the middle.

There is anchorage, free from mosquitoes, off Piaboeng (Piabung) village, near the head of the bay and on its south-western side, in a depth of about 7 fathoms ($12^{m}8$), about three-quarters of a cable offshore. There is a small pier here, suitable for lighters. A few provisions may be obtained. Wai Ratai, an unimportant river, discharges into the head of the bay, and off its mouth is a mudbank.

Charts 1653a, 941a, 1263.

Chart 2056.

There are several villages, connected by a good road, on the northern shore of the bay.

Coast.—Dangers.—The coast northward of Ratai baai, between Ujong Tjoekoe Tjentiga and Tanjong Tambikil (*Lat. 5° 31′ S., Long. 105° 16′ E.*), about 4½ miles northward, is alternately hilly and marshy, and is fringed by an extensive coral reef. Tegal, an island, 385 feet (117^{m}3) high, lying about one mile offshore, and about 2 miles north-eastward of Maitem, is entirely covered with coconut trees; there is a bay on the eastern side of Tegal, where small vessels with local knowledge can anchor. A reef, with a sandbank above water on its western side, lies between Tegal and the coast westward; there is a narrow, but deep channel on either side of this reef.

Eastern side of Lampoeng baai.—Dangers.—The coast between the eastern entrance point of Lampoeng baai, and Kaliandak village, about 5½ miles northward, is fringed by a reef, with rocks above water in places; owing to the heavy surf, landing on this coast is dangerous with westerly winds. There are several villages, and behind them rises Radja Basa, with two summits, the south-eastern of which is named Barilang (*see* also page 52); Radja Basa is prominent when seen from the Java sea, but not from Lampoeng baai. Anchorage may be obtained off Tjanti (Chanti) village, about 3½ miles southward of Kaliandak, in a depth of 8 fathoms (14^{m}6) mud, with the southernmost of the Tiga eilanden (page 66) bearing 236°.

Chart 2056, plan of Kaliandak road.

Reede Kaliandak. — Light. — Danger. — Anchorage may be obtained, in a depth of 6½ fathoms (11^{m}9), mud, in Reede Kaliandak, with the flagstaff, at the root of the pier, in line with the head of the pier, bearing 112°.

A rock, which dries, lies 3½ cables north-westward of the pier-head and about 3 cables offshore.

A light is exhibited, at an elevation of 47 feet (14^{m}3), from a white iron framework structure, 43 feet (13^{m}1) in height, on the pier-head.

Hot springs rise among the rocks near the village.

The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Prohibited anchorage.—Two cables are landed at a cable house southward of Kaliandak village; anchorage is prohibited within a quarter of a cable of these cables.

Chart 2056.

Coast.—Dangers.—The coast between Kaliandak and Belantoeng (Belantung) baai, about 3½ miles north-westward, is low and is fringed by a white sandy beach. Belantoeng baai, although free from dangers, affords no sheltered anchorage; a reef, with a depth of 1½ fathoms (2^{m}7) over it, lies about 2 cables south-eastward of Ujong Tjoekoe Belantoeng (Chuku Belantung), the western entrance point, and a rock, which dries, lies about 7 cables southward of the eastern entrance point. There are two small villages on the western shore of the bay.

The coast between Belantoeng baai and Teloekbetoeng (Telukbetung), about 20 miles north-westward, is high and is fringed by a steep-to coastal reef, on which the sea breaks heavily with westerly winds; except for the reefs northward and eastward of the Tjendoeng eilanden, there are no dangers along this part of the coast.

Tjendoeng (Chendung) eilanden, about 7 miles south-south-eastward

Chart 2056.

of Teloekbetoeng (*Lat. 5° 27′ S., Long. 105° 16′ E.*), consist of the three islets Tjendoeng Laoet (Chendung Laut), Soelah (Sulah) and Darat. Soelah, the northernmost, is a high, steep rock; the other two are lower. A reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies about three-quarters of a mile north-north-westward of Soelah and about one mile offshore, and some reefs lie between Darat and the coast about one mile eastward.

Chart 3611, plan of Telukbetung road.

Head of Lampoeng baai.—Light.—Islets and dangers.—The western side of the head of Lampoeng baai, between Tanjong Tambikil and Teloekbetoeng, about 4 miles northward, is encumbered with islets, reefs, and sandbanks. Tangkil, an islet covered with coconut trees, lies about half a mile north-eastward of Tanjong Tambikil; there is a clear channel between Tangkil and the coast westward. Koeboer (Kubur), nearly 2 miles northward of Tanjong Tambikil, and Pasaran, about 1¼ miles farther northward, are low islets. Pamoenggoetan (Pamanggutan), a sandbank about half a mile north-eastward of Koeboer, covers entirely at high water. There are several other reefs in this vicinity, and their positions can be seen best on the chart.

A light is exhibited, at an elevation of 57 feet ($17^{m}4$), from a white iron beacon, on a reef lying about 6 cables east-south-eastward of Pasaran.

Reede Teloekbetoeng.—Teloekbetoeng, the principal town and seat of Government for the Lampoeng district, is situated on the north-eastern side of the mouth of Wai Koeripan (Kuripan), which flows out about 4 cables northward of Pasaran. On the eastern side of the town is Koenjit (Kunyit), a hill, 315 feet ($96^{m}0$) high, shaped like a sugarloaf. Nearly all the trade is now carried out at Oosthaven, on the eastern side of the head of Lampoeng baai so that Reede Teloekbetoeng is only used by small vessels, which anchor as close as possible off Pasaran. There are warehouses on the left bank of Wai Koeripan; this river can only be entered by praus at high water, and at low water goods are carried ashore by wading over the hard sandbank fronting the mouth.

Scarcely any stream is perceptible in the roadstead, and vessels always lie to the wind. Teloekbetoeng is connected with the general telegraph system.

Oosthaven.—Lights.—Buoyage.—Oosthaven, formed by natural breakwaters of sand and coral, has general depths of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$) in it, and is available for large vessels. As the entrance, which is about 1½ cables wide between the 5-fathom ($9^{m}1$) lines on either side, lies on the northern side, the harbour is completely sheltered. Pandjang (Panjang) station (*Lat. 5° 29′ S., Long. 105° 19′ E.*), the terminus of the South Sumatra railway, is situated at the head of the harbour.

At the head of the harbour near Pandjang station, there is a commercial quay, about 540 feet ($164^{m}6$) long, with a depth of about 26 feet ($7^{m}9$) alongside, connected to the railway, and there are several mooring buoys near it. North-eastward of this quay is a pier about 260 feet ($79^{m}2$) in length, and farther north-eastward is a quay for praus, with wooden steps, having a depth of about 20 feet ($6^{m}1$) alongside.

A light is exhibited, at an elevation of 29 feet ($8^{m}8$), from a white

Chart 3611, plan of Telukbetung road.

iron structure, 23 feet ($7^{m}0$) in height, on the prau quay at Oosthaven.

The western side of the entrance to Oosthaven is marked by two light-buoys painted white; the outer light-buoy exhibits a *green fixed* light, and the inner one a *white fixed* light. The eastern side of the entrance is marked by a black can buoy and a light-buoy painted black exhibiting a *red fixed* light. The coastal reef on the western side of the harbour is marked by three white conical buoys, and that on the north-eastern side by two black can buoys, and a light-buoy, painted black, exhibiting a *red fixed* light.

Provisions are obtainable, and water is laid on to the quay. There is a harbour doctor. Vessels of the Koninklijke Paketvaart Maatschappij carry out a regular service between Teloekbetoeng and Poelomerak (page 50) in Java; the town is connected to the general telegraph system.

NORTH-WESTERN SIDE OF SUNDA STRAIT (*contd.*).—**Danger.**—Mengkoedoe (Mengkudu) and Sekepel are two islets lying close to the coast about 3¾ miles north-north-westward of Varkenshoek, and are difficult to identify. Mengkoedoe is composed of light yellow sandstone, and has two hillocks, about 66 feet ($20^{m}1$) high, and covered with brushwood, near the extremities; a reef, with some rocks above water on it, extends about one cable from the western side, and a detached rock above water lies close off the southern extremity. Sekepel has a somewhat higher part on the southern side, also consisting of light yellow sandstone, and is entirely bare; it is fringed by a coral reef. There is usually a heavy swell off this part of the coast, but landing can be effected north-westward of Mengkoedoe. Abreast these islands the coast becomes lower, with hilly ridges sloping down gradually to Varkens hoek.

Varkens hoek is a high, rocky, and wooded point, joined to the higher land behind by a low, bare ridge. Half a cable westward of the point is a rock above water. Close off the point are depths of 40 fathoms ($73^{m}2$). Approaching from westward the south-western extremity of Kandang Balak (page 63) appears from behind Varkens hoek when the latter bears less than 077°; these two points and the southern extremity of Hout eiland all somewhat resemble each other when seen from westward. From eastward Varkens hoek is easily identified.

Tims klip, about 1½ miles north-westward of Varkens hoek, is small, but can be seen from a distance of about 3 miles; there are depths of from 17 to 29 fathoms ($31^{m}1$ to $53^{m}0$) close around the rock.

Chart 3611, plan of the Zutphen islands.

Between Varkens hoek and Tanjong Bawang (*Lat. 5° 54′ S., Long. 105° 44′ E.*), about half a mile north-eastward, the coast forms a small bight fringed by a narrow reef, thence for half a mile north-eastward, it is steep and rocky; thence it becomes more or less flat as far as Steile hoek, about 5¾ miles north-eastward of Varkens hoek, the mountains lying a little distance inland; it is fringed by a narrow coastal reef with some rocks on it.

The hilly islet Sindoe (Sindu) lies close off the rocky Tanjong Gading, about 1¼ miles north-north-eastward of Tanjong Bawang. Fairly good anchorage may be obtained by vessels with local knowledge

Chart 3611, plan of the Zutphen islands.

southward of this islet, in a depth of 3½ fathoms ($6^{m}4$), with the summit of Rimau Balak in line with the southern extremity of Sindoe, bearing about 052°, and the southern extremity of Kandang Balak bearing 123°; this anchorage is open to the southerly swell, but in the east monsoon vessels lie better here than eastward of the Zutphen eilanden. Pegantoengan (Pegantungan) village is situated on a small river three-quarters of a mile northward of Tanjong Gading, but it is not visible from northward or southward.

Steile hoek, a high, prominent point, is formed by a spur running eastward from the saddle-shaped hill Pantjong (Panchong), which is 732 feet ($223^{m}1$) high; from north-eastward a separate summit appears to lie just within the point, and this is still visible when 2 miles eastward of Moendoe (Mundu) (chart 2056), an islet about 1½ miles offshore and 10 miles north-north-eastward of Steile hoek. A coastal reef extends nearly half a cable from the point, with the 5-fathom ($9^{m}1$) line close outside. Soemoer (Sumur) village stands a little distance inland, about half a mile north-north-westward of the point.

In addition to Pantjong, the following hills are noticeable: Sepan, a conical hill, 682 feet ($207^{m}9$) high, about half a mile westward of Pantjong; Tjikoer (Chikur), 824 feet ($251^{m}2$) high, 1¼ miles west-south-westward of Sepan, with a round summit covered with grass, which is very prominent owing to its light green colour, especially when the sun shines on it.

The east coast of Sumatra northward of Steile hoek is continued on page 67.

Zutphen eilanden.—Zutphen eilanden are a group of four islands and a number of islets lying within 2½ miles of the Sumatra coast between Varkens hoek and Steile hoek; most of the islands are high, and all are densely wooded. The depths between the islands and reefs are very variable; the bottom is rocky and covered with sand. In the west monsoon the north-east-going stream was observed to have a maximum rate of 4¾ knots; it is advisable to give the islands a berth of fully 1½ miles.

Kandang Balak, the south-western island, has two separate hills, the south-western, having an elevation of 322 feet ($98^{m}1$), being the higher; elsewhere the island is flat. The east coast is mostly rocky. Hoog eiland, 315 feet ($96^{m}0$) high, lies close north-eastward of Kandang Balak, and has a narrow flat strip only on its northern and western sides. There is a bare rock southward of Hoog eiland (*Lat. 5° 53′ S., Long. 105° 46′ E.*), named Pandjoekoet (Panjukut).

Gosong Temboelong (Tembulung) besar and Gosong Temboelong (Tembulung) kechil lie about 3¼ and 1¾ cables, respectively, off the north-western side of Kandang Balak.

Hout eiland or Pandjoerit, 2½ cables south-eastward of Hoog eiland, has a ridge of hills along its southern side, terminating in a prominent point named Tanjong Karang Batang, the south-eastern extremity of the island. The southern coast and western extremity are rocky; the northern and eastern coasts are flat.

Gebroeders, two islets close together about 2½ cables northward of Hoog eiland, and Kelapa, about 6 cables westward of them and about 2 cables off the Sumatra coast, are low. A dangerous reef, which dries, lies about 6 cables north-eastward of Kelapa.

Rimau Balak, the largest and highest of the Zutphen eilanden,

Charts 2056, 1653a, 941a, 1263.

Chart 3611, plan of the Zutphen islands.

lies about 4 cables north-eastward of Gebroeders and has three summits, the south-western having an elevation of 696 feet ($212^{m}2$) and being very noticeable. Boompjes rif, close off the south coast of Rimau Balak, dries at the eastern and western ends, and at high water some rocks still show.

Rimau Leonik (Lunik), about 1½ cables north-eastward of Rimau Balak, has a sharp summit at the north-eastern end. Toempel (Tumpel) and Kramat, in the channel westward of Rimau Balak (*Lat. 5° 51′ S., Long. 105° 47′ E.*), are low.

Owing to the strong currents, vessels are advised not to attempt the channel between the Zutphen eilanden and the main coast; it is, however, easy to navigate by the chart, especially as some of the reefs which dry have vegetation on them in places.

Chart 2056.

ISLANDS IN THE NORTHERN PART OF SUNDA STRAIT.—Krakatau.—Krakatau is an island with an active volcano 2,667 feet ($812^{m}9$) high, lying about 21 miles south-westward of Varkens hoek; it was in eruption in the year 1680, and then remained in a state of quiescence for upwards of 200 years. In the year 1883, on 20th May the volcano burst out with great violence, accompanied by earthquakes, which were severely felt at Batavia, and at the same time vast showers of pumice and ashes were projected to a great distance. The eruption was observed from the Imperial German ship *Elizabeth*, and on the following day, when 100 miles from Krakatau, a shower of dust was experienced which was estimated to become a layer one inch in thickness in 24 hours, and this was still falling when the vessel had gained a position 300 miles south-westward of Sunda strait.

On 26th August of the same year, Krakatau again burst into eruption, and it was of such a violent nature that miles of coast on both sides of the strait were wholly devastated, and multitudes of people perished. On the 27th August, a succession of earthquake waves swept the shores of the strait, utterly destroying the towns of Anjer, Merak, Tjaringin, and Teloekbetoeng, together with some of the lighthouses on both shores. This remarkable disturbance of the sea made itself felt in various parts of the world on the same date, notably in Australia and South Africa, also at Karachi, in India.

The vast amount of pumice which lay upon the surface of the sea, in some places many feet in thickness, gave an appearance as if the ocean bed had appeared above water.

The steam from the volcano was estimated to have been driven to a height of more than 12 miles, and the rain of ashes fell over all southern Sumatra and northward to Singapore, eastward to Batavia and south-westward to the Cocos islands; finer particles of dust floating in the upper atmosphere enveloped the earth, and caused brilliant sunsets up to December of that year. The sound of the explosions was heard at Perth in Western Australia, in New Guinea, Ceylon, and Mauritius.

The tidal wave which, where obstructed, increased greatly in volume, was observed at Toppershoedje to rise 72 feet ($21^{m}9$); at Merak, between the island and the mainland, about 120 feet ($36^{m}6$); and from Varkens hoek to Teloekbetoeng the average height was about

Charts 1653a, 941a, 1263.

Chart 2056.

80 feet (24^{m}4). Every object on the shore, as far inland as the first range of hills, was levelled to the ground, and where the land was low the sea penetrated 5 miles inward. At Teloekbetoeng (*Lat. 5° 27′ S., Long. 105° 16′ E.*) the water rose to the square of the resident's house, 118 feet (36^{m}0) above high water; and the Government steamer *Berouw* was swept over the pier into the Chinese quarter of the town, a distance of nearly 2 miles from the anchorage. The undulation was felt on the north coast of Java; in Batavia roadstead it rose 8 feet (2^{m}4) in height, and, in Tandjoeng Priok haven, on 27th August, from 1230 to 1330, the water suddenly fell 18 feet (5^{m}5).

The island, for 100 feet (30^{m}5) up, remained a mass of glowing lava and stones; all animal and vegetable life was destroyed, and it was five years before verdure again returned. Before the eruption, which completely destroyed that portion northward of the highest peak, the island was 5 miles by 3 miles in extent; the northern side of the island now rises perpendicularly from the sea, the remainder is covered with vegetation. *See* view facing page 52.

According to the official report, 36,417 persons perished, 37 of these being Europeans.

Caution.—Owing to volcanic eruption, the area between Krakatau and Sebesi, about 10 miles northward, must be considered as unsafe, and routes outside this group should be taken by vessels. In 1928, Anak Krakatau, an islet, appeared midway between Verlaten and Lang eilanden, where formerly a bank with a depth of 15 fathoms (27^{m}4) was charted; in 1929, this islet disappeared, but again came to the surface by eruption in 1930, and, after heavy eruptions in February, 1933, appears to have increased in size. In 1935, this islet, almost circular in shape, had a diameter of about 4,000 feet (1,219^{m}2), and an elevation of about 206 feet (62^{m}8), and, in 1940, was 410 feet (125^{m}0) high. In 1948, there were a few casuarina trees on the northern extremity of the islet.

Verlaten and Lang eilanden.—Verlaten eiland, about 3½ miles north-westward of Krakatau, is also an active volcano, and is nearly three times larger in area than formerly. Lang eiland, about 1¾ miles northward of Krakatau, does not appear to have altered much, but the channel between it and Krakatau has widened considerably.

Bootsmans rots (Boatswains rock), 13 feet (4^{m}0) high, lies about three-quarters of a mile south-westward of Lang eiland, and rises perpendicularly from great depths.

Zee klip (Sea rocks), about 5 miles northward of Verlaten eiland (*Lat. 6° 06′ S., Long. 105° 23′ E.*), are two steep-to rocks about 30 feet (9^{m}1)high, lying close together, and can be seen from a great distance; the southern and larger has a cleft in it, and the sea always breaks heavily on it.

Steers and Calmeyer reefs, with least depths of 1¼ and 3¼ fathoms (2^{m}3 and 5^{m}9) over them, respectively, are the highest parts of a great bank, on which the sea continually breaks, formed by the eruption of Krakatau lying southward of Sebesi.

Sebesi and Seboekoe.—Light.—Dangers.—Sebesi, an island about 7 miles northward of Lang eiland, appears as a mountain with two peaks, the south-western being 2,769 feet (844^{m}0) high and the higher of the two. Booms rots (Boom rock), above water, lies about half a mile off the southern side. Huismans eiland lies close off the

Charts 1653a, 941a, 1263.

Chart 2056.

north-eastern side; a ridge, with a depth of about 10 fathoms (18^m3) over it, extends about half a mile south-south-eastward from it.

Seboekoe (Sebuku), about one mile northward of Sebesi, is 1,188 feet (362^m1) high. A reef extends about 1½ miles from its western side, with a large rock above water near the outer edge; reefs also extend from some of the points of the island but they are not generally broad and are usually marked by rocks above water, on which is frequently a heavy surf. Seboekoe (Sebuku) kechil, 460 feet (140^m2) high, lies about half a mile off the east coast; a reef, which dries, extends from the southern side of the islet, and northward of the islet is a steep-to coral reef, partly above water.

A light is exhibited, at an elevation of 114 feet (34^m7), from a white iron framework structure, 33 feet (10^m1) in height, on Ujong Tjoekoe (Chuku) Banding, the northern extremity of Seboekoe.

There is good anchorage for small vessels, in depths of from 15 to 18 fathoms (27^m4 to 32^m9), clay, between Seboekoe kechil and Seboekoe. With bad weather from westward large vessels can anchor, in depths of from 13 to 15 fathoms (23^m8 to 27^m4), clay, eastward of Seboekoe kechil.

The channel between Sebesi and Sebkoekoe is free from danger. The channel between the shoals extending westward from Seboekoe and the Legoendi eilanden, may be safely used, and also the channel between Seboekoe and the Sumatra coast.

Tiga eilanden.—Tiga eilanden, 2 miles northward of Seboekoe, are rocky; the north-western islet is the largest, and from its north-western side a reef extends nearly 2½ cables, and is usually marked by breakers. There are depths of about 18 fathoms (32^m9) between the two south-eastern islets.

DIRECTIONS FOR SUNDA STRAIT.—Vessels making for Sunda strait from the Indian ocean, and steering for the south-western extremity of Java, will first sight Pajoeng (page 44), which may sometimes be seen from a distance of 40 miles; closer in the lower land comes in sight, as well as Prinsen eiland and the cone-shaped Raksa. *See* the caution on page 44 on making the land in hazy weather, and view on chart 2056.

If making a landfall near Vlakke hoek (*Lat. 5° 55′ S., Long. 104° 33′ E.*) on the Sumatra coast, Tanggamoes and the summit of Taboean eiland will be sighted first.

Vessels from southward may take Behouden passage or may pass westward of Prinsen eiland, thence proceeding through the strait southward of Krakatau, and on either side of Dwars in deg weg.

If the land has been made in the vicinity of Vlakke hoek, the Sumatra side may be held, passing between Sebesi and Seboekoe; or vessels may pass southward of Krakatau, keeping more towards the Java shore. At night, except with local knowledge and a bright moon, the latter route is advisable, as vessels will then sight the light on Vierde punt soon after passing Krakatau. The light on Toppershoedje will assist a vessel in navigating the north-eastern part of the strait; the passage eastward of Dwars in deg weg is clear of dangers, whereas Stroom klip lies in the passage westward of that island, and further north-eastward is Winsor klip.

Charts 1653a, 941a, 1263.

CHAPTER IV

FROM SUNDA STRAIT NORTHWARD, AND TO TANDJOENG PRIOK HAVEN

Charts 2056, 2149.

JAVA SEA.—Considerable swell comes through from the China sea, particularly during the strength of the North-west monsoon, and a turbulent sea is frequently experienced, partly attributable to varying currents running in opposition to the wind.

Climate and weather.—*See* page 17.

Tidal streams.—Under the Sumatra coast there is a diurnal, weak tidal stream, running southward with the falling tide and northward with the rising tide ; the change from south-going to north-going occurs practically at the time of low water, and turns against the sun or anti-clockwise. During the South-east monsoon the direction of the south-going stream alters to south-south-west and south-west, and the north-going stream to north-north-west to north-west ; during the West monsoon the south-going stream runs in a south-south-east to south-east direction, and the north-going stream in a north to north-north-west direction. In both monsoons the south-going stream is strengthened by the monsoon, and the north-going stream is weakened. *See* also on page 6.

EAST COAST OF SUMATRA.—Caution.—For some distance off the east coast of Sumatra, within the 20-fathom ($36^{m}6$) line, are numerous small, hard, steep-to shoals, of which little warning is given by sounding ; there is generally hard ground (white or black sand, with or without shells) in the vicinity of the most important of these shoals. The portion of the east coast of Sumatra described in this volume should not be approached, except in case of necessity, within 12 to 16 miles ; vessels proceeding from Sunda strait to Banka strait usually shape course to pass near Noordwachter (North Watcher) (page 70), which lies about 35 miles from the coast.

Winds.—Between April and October strong south-south-westerly winds occur at times southward of Gebroeders (Two Brothers), generally setting in during the evening and blowing all night.

Chart 2056.

Coast.—Ujong Kanggalan (*Lat. 5° 48′ S., Long. 105° 48′ E.*) is a low point about 3 miles north-north-eastward of Steile hoek (page 63), the intervening coast being low and wooded. A reef, with a depth of 2½ fathoms ($4^{m}6$) over it, lies about 2 cables eastward of Ujong Kang-

Charts 1653a, 941a, 1263.

Chart 2056.

galan. From abreast this point the western of the two peaks of Radja Basa (page 52) is noticeable. Taman, a hill, 774 feet ($235^{m}9$) high, 2½ miles westward of Ujong Kanggalan, is a good landmark, and about 2 miles north-eastward of the hill, and near the coast, is a very prominent, isolated, conical hill, 226 feet ($68^{m}9$) high.

Ketapang village is situated near the coast 3 miles northward of Ujong Kanggalan. Close northward of the village some steep, rocky cliffs, named Batoe Poetih (Batu Putih), border the coast for about 2 cables; as these cliffs are very light in colour they can be seen from some distance, when the sun shines on them. Northward of Batoe Poetih cliffs the coast is low, marshy, thickly wooded, and fronted by a sandy beach.

Islets and reefs.—Koepiah (Kupiah), high and wooded, lies about 8 cables northward of Ujong Kanggalan and half a mile offshore.

De Gezusters are three low islets lying near the coast about 2½ miles northward of Ujong Kanggalan (*Lat. 5° 48′ S., Long. 105° 48′ E.*). The western half of Seram, the northernmost and largest, is covered with high coconut trees, and the eastern side is a swamp, with a few bare tree trunks on it; a coral patch, with a depth of 5½ fathoms ($10^{m}1$) over it, lies about three-quarters of a mile eastward of this islet. The middle and smallest islet is almost entirely formed of coral, and is covered with bushes and a few bare trees. The southern islet is covered with low brushwood, with a few coconut trees, and there is a sandy beach on its north-western side. Seram is the only islet that can be seen from any distance. They all lie within the 3-fathom ($5^{m}5$) line; small craft with local knowledge can find shelter between them and the coast, where there are depths of a few feet, sand and mud.

Moendoe (Mundu), about 3¾ miles north-north-eastward of Seram, is a low coral island covered with coconut trees, and fringed by a reef with some rocks above water on it; Sina eilandje lies close southward of the island. Sibrandi rif, half a mile eastward of Sina, has a least depth of 3¼ fathoms ($5^{m}9$) over it, and is very steep-to on its eastern side; the passage between the reef and Moendoe is unsafe.

Directions.—Vessels proceeding northward from De Gezusters, and passing between Moendoe and the coast, will keep in depths of over 5 fathoms ($9^{m}1$) by keeping the summit of Rimau Balak (page 63) bearing about 197°, and open just eastward of the eastern side of Seram.

Sekampoeng rivier. — Anchorage. — Tanjong Sekampoeng (Sekampung) lies 6 miles northward of Moendoe, but is difficult to distinguish unless close inshore southward of it; Sekampoeng (Sekampung) rivier, one of the largest rivers in the Lampoeng district of Sumatra, flows out on the northern side of the point. There is no special channel over the bar, on which there is generally surf in the South-east monsoon, but by keeping the mouth of the river open, on a bearing of about 247°, a least depth of 2 feet ($0^{m}6$) can be carried over it; within the mouth the depths increase rapidly to 4 and 5 fathoms ($7^{m}3$ and $9^{m}1$). Asahan village is situated about 32 miles up the river.

There is anchorage off Sekampoeng rivier, in a depth of 9 fathoms ($16^{m}5$), 1½ miles offshore, with a prominent tree on Moendoe bearing 188°, and the mouth of the river open, bearing 247°. The rate of the stream is from 1½ to 2 knots.

Coast.—Dangers.—The coast between Tanjong Sekampoen and

Charts 1653a, 941a, 1263.

Chart 2056.

Tanjong Penet, 19 miles northward, is thickly wooded with high trees, sometimes visible up to a distance of 14 miles. Several rivers flow out, the principal being the Niboeng (Nibung) and Maringgai, about 9 and 13 miles, respectively, northward of Tanjong Sekampoeng, which are accessible for boats at high water; the latter river can be ascended as far as Maringgai village, about 2 miles up. Tanjong Penet is a round point, and can only be distinguished when within 4 miles of the coast; a reef, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 3¾ miles southward of this point and close outside the 3-fathom ($5^{m}5$) line. Wai Penet, which flows out close northward of Tanjong Penet, is of no importance.

Pematang Oerai, about 10 miles north-north-westward of Tanjong Sekampoeng, is 610 feet ($185^{m}9$) high and the southernmost of a very conspicuous group of hills decreasing in elevation northward. Samang, a hill 5 miles north-north-eastward of Pematang Oerai, is 742 feet ($226^{m}2$) high. Knobbel berg, about 12½ miles westward of Tanjong Penet, is 810 feet ($246^{m}9$) high, and is very prominent on account of a knob on its summit, having the same appearance from all directions.

Charts 2056, 2149.

Between Tanjong Penet (*Lat. 5° 16′ S., Long. 105° 52′ E.*) and Tanjong Sekopong, about 20 miles northward, the land is flat, thickly wooded, and indistinguishable from any distance. Tanjong Sekopong is a round, prominent point, thickly wooded with high trees; a peninsula, covered with casuarina trees, extends from the point, and is connected to it by a narrow strip with only a few trees on it. Tanjong Sekopong cannot be distinguished beyond the 5-fathom ($9^{m}1$) line.

Sjahbandar (Shahbandar) bank consists of a number of sandy ridges lying within 8 miles of the coast nearly midway between Tanjong Penet and Tanjong Sekopong; they all lie within the 5-fathom ($9^{m}1$) line.

Chart 2056.

ISLETS AND DANGERS IN NORTHERN APPROACH TO SUNDA STRAIT.—Light.—The usual route for vessels bound for Sunda strait from northward lies between Brouwers banken and Noordwachter, or close to Gebroeders, which can be passed on either side; the islets and dangers near this route are described hereafter. Gedé (page 49), a mountain on the north-western extremity of Java, is sometimes visible from Gebroeders (Two Brothers).

Gebroeders, about 16 miles east-north-eastward of Tanjong Penet, are two coral islets thickly wooded with high trees; they are surrounded by a coral reef, which dries, with some rocks and patches of sand above water on it. A coral patch, with a depth of 2 feet ($0^{m}6$) over it, lies about 3 cables southward of the southern islet. In the West monsoon Gebroeders can sometimes be seen from a distance of 20 miles, but in the South-east monsoon they are not visible until very much nearer.

Vessels passing westward of Gebroeders will find the hills described above useful for guiding them through this channel, and they should keep on the eastern side of it; at night, or with bad visibility, they should keep in depths of over 6 fathoms ($11^{m}0$).

Lynn reef, about 6 miles east-south-eastward of Gebroeders, is of coral and has a least depth of 2 feet ($0^{m}6$) over it, with depths of from 6 to

Charts 2149, 1653a, 941a, 1263.

Chart 2056.

13 fathoms (11$^{\rm m}$0 to 23$^{\rm m}$8), mud and sand, about one cable outside it. The reef is barely marked by ripples and discoloration, and can only be detected when close to; it sometimes breaks with a heavy easterly swell.

Swallow reef, with a depth of 26 feet (7$^{\rm m}$9) over it, and steep-to, is a coral patch lying 7¾ miles south-south-westward of Gebroeders.

A 4¾-fathom (8$^{\rm m}$7) patch lies about 5½ miles west-north-westward of Swallow reef.

Brouwers banken, about 11 miles north-eastward of Gebroeders, are two coral patches about 2 cables apart, with some rocks just above water on each, and a small patch of coral sand on the northern. The reefs are generally visible from a distance of 2 miles.

Samang (page 69), in line with the northern islet of Gebroeders (*Lat. 5° 10′ S., Long. 106° 07′ E.*), bearing about 241°, leads close north-westward of Brouwers banken; the same hill bearing about 245°, and open south-eastward of the southern islet, leads close south-eastward.

Chart 2149.

At about 6 miles north-westward of Brouwers banken a bank was passed over by H.M.S. *Magpie* in 1883; a least depth of 6½ fathoms (11$^{\rm m}$9) was obtained, with Gebroeders bearing 203°, distant 8 miles.

Chart 2056.

Noordwachter, about 21 miles eastward of Gebroeders, is entirely covered with high trees, and is generally visible 14 miles. The island is surrounded by a reef which partly dries. There is a small haven on the north-western side, formed by a coral breakwater, affording good anchorage for boats; there is also a stone breakwater westward of the lighthouse.

Omega, a reef, with a depth of 2 feet (0$^{\rm m}$6) over it, lies about half a mile south-eastward of Noordwachter, and Karang Pajong, with a depth of 5 feet (1$^{\rm m}$5) over it, lies about the same distance southward of the island; between these two reefs and the island there are depths of 14 fathoms (25$^{\rm m}$6), mud and sand.

A light is exhibited, at an elevation of 159 feet (48$^{\rm m}$5), from a white iron framework tower, 157 feet (47$^{\rm m}$9) in height, on Noordwachter.

Jason rock, 16½ miles south-westward of Noordwachter, is a small coral patch, with a least depth of 2 fathoms (3$^{\rm m}$7) over it, and only under very favourable conditions is there discoloration in the immediate vicinity, and very occasionally there are tide-rips.

When approaching from southward at night, it must be borne in mind that this danger lies only just within the limits of visibility of Noordwachter light. From northward it is advisable to bring the light astern, bearing 057°, which leads between Jason rock and Swallow reef; after passing these dangers course can be altered for Toppershoedje (Toppers) light, at the northern entrance to Sunda strait.

Arminia rock, about 13 miles south-south-westward of Noordwachter, is a small steep-to patch, with a depth of 2½ fathoms (4$^{\rm m}$6) over it, and is not marked by discoloration.

Western side of Duizend eilanden.—Dangers.—Duizend eilanden (Thousand islands), about 80 in number, in addition to many reefs, rocks, and drying banks, extend in a northerly and southerly direction over a distance of about 23 miles, and lie with their southern end about 14 miles off the north coast of Java; all these islets are low

Charts 2149, 1653a, 941a, 1263.

Chart 2056.

and wooded, some with very high trees, visible from a distance of 16 miles. Only a few, near the centre of the group, are permanently inhabited, but there are temporary fishermen's settlements. As all the islets are very much alike, and are, therefore, difficult to distinguish, it is inadvisable to attempt to pass through the group. The western side of the group is of more or less importance for vessels proceeding northward from Sunda strait, and making Noordwachter, and *vice versa*; a brief description is given hereafter. It must be taken into consideration, however, that some of the details are taken from the Netherlands Government survey of this part, as far back as 1887; for further details the charts should be consulted.

North-westward of the main group of Duizend eilanden, and separated from it by a channel with depths of from 14 to 17 fathoms ($25^{m}6$ to $31^{m}1$), is a smaller group consisting of four islets and several reefs; Jason and Arminia rocks, the westernmost dangers of this group, which lie near the direct route from Noordwachter to Sunda strait, are described on page 70.

Hereward, a reef, about 3 miles eastward of Arminia klip (*Lat. 5° 24′ S., Long. 106° 22′ E.*), has a depth of 1¼ fathoms ($2^{m}3$) over it, and is not marked by discoloration.

Doea (Dua) eilanden, two in number, are the northernmost of the Duizend eilanden; they are thickly wooded with high trees and lie about 12½ miles southward of Noordwachter.

Gosong Rangat, an islet, 3½ miles south-westward of Doea eilanden, is also wooded with high trees. Beronang rif, with a depth of 1¼ fathoms ($2^{m}3$) over it, and Edeling reefs, with depths of 3¾ and 4¼ fathoms ($6^{m}9$ and $7^{m}8$) over them, respectively, lie between Gosong Rangat and the Doea eilanden. Rangat riffen, with a least depth of 3 feet ($0^{m}9$) over them, lie about one mile south-eastward of Gosong Rangat; they are usually marked by discoloration and break with any sea.

West eiland, about 2¾ miles west-south-westward of Gosong Rangat, is thickly wooded with high trees. Coventry reef, about one mile southward of West eiland, dries in patches at its northern end; it is marked by discoloration, and breaks with the least sea or swell.

Kapas, an islet, 6 miles south-eastward of Gosong Rangat and on the western side of the main group of Duizend eilanden, is a patch of sand with a couple of noticeable high casuarina trees on it, some distance apart from each other. Joe (Ju), an islet, 2 miles southward of Kapas, is thickly wooded with high trees; a small patch of white coral sand, always above water and visible from a considerable distance, lies on a reef about half a mile northward of Joe. Matjan (Machan), a reef marked by discoloration and by breakers when there is any sea, lies about one mile north-westward of Genting, an island lying about 4½ miles south-south-eastward of Joe. Soei (Sui) rif, nearly 4 miles southward of Joe and about 1½ miles westward of Genting, is not marked by discoloration; the eastern of the two Beronang riffen, about 1½ miles south-westward of Genting, is marked by discoloration. Pilang rif, 3½ miles south-westward of Genting, has a small patch of sand on it, visible 3 miles in clear weather. Moenggoe (Mungu), a reef about a mile south-westward of Pilang rif, partly dries, is marked by discoloration, and breaks with any sea. Kelapa, an island, near the middle of the group and about 2¼ miles south-south-eastward of

Charts 1653a, 941a, 1263.

Chart 2056.

Genting, is covered with coconut trees and is inhabited; Semoet (Semut) and Kotak kechil, about three-quarters of a mile and 2¾ miles south-south-westward, respectively, of Kelapa, have some high trees on their western extremities, visible from a considerable distance; Kotak besar (*Lat. 5° 42′ S., Long. 106° 32′ E.*), about three-quarters of a mile southward of Kotak kechil, is covered with coconut trees and brushwood, except in the western part, which is a large grass field.

The eastern side of Duizend eilanden is described on page 78.

Winds.—Winds are stronger amongst Duizend eilanden than under the Java coast, especially in the South-east monsoon, and are then often strongest and least steady during the night. There are appreciable land and sea breezes from and towards Java.

SUNDA STRAIT TO TANDJOENG PRIOK HAVEN.—

North coast of Java.—The north coast of Java between St. Nicolaas punt (*Lat. 5° 52′ S., Long. 106° 03′ E.*) (page 51) and Tanjong Krawang, 58 miles eastward, is generally low, marshy, and thickly wooded. Except for the mountains southward of St. Nicolaas punt (described on page 49), Pinang, a hill 11½ miles south-south-eastward of St. Nicolaas punt, and the islets off Baai van Banten, there are few prominent landmarks on the coast along the usual route from Sunda strait to Tandjoeng Priok haven.

Chart 1653a.

The high mountainous land far inland southward of Batavia is usually only visible in the west monsoon, or occasionally early in the mornings in the east monsoon; the principal peaks (chart 1653a) are Salak, 7,251 feet (2,210^{m}l) high, about 65 miles south-eastward of St. Nicolaas punt; Pangrango, 9,902 feet (3,018^{m}l), in the form of a truncated cone, 14½ miles east-south-eastward of Salak, and Gedé, 9,715 feet (2,961^{m}l), close south-eastward of Pangrango. A white column of smoke is often seen rising from the crater on the northern side of the western of its two peaks.

Chart 2056.

Caution.—As nearly all the rivers flow into the sea between low points of land, bringing down a considerable amount of débris with them, both the land and the coastal bank may be extending seaward at these places; such points, therefore, should never be rounded by bearing and distance, but by sounding, keeping in depths of over 5 fathoms (9^{m}l).

Winds and weather.—On this coast, between Sunda strait and long. 111° E., during the westerly monsoon, the sea breeze adds strength to the wind, and draws it into north-west or north during the daytime, but the land wind is seldom felt. Both land and sea breezes occur during the South-east monsoon. Between the monsoons calms are common, with occasional squalls. These may be from any direction, and are usually associated with thunderstorms, especially in March and April.

Coast.—Light.—Tanjong Piatoe (Piatu), 2 miles eastward of St. Nicolaas punt, is low with a few trees on it; the low coral islet Salira, which also has a few trees on it, lies about 2 cables offshore between these two points. Kali eilanden, lying about 2 cables offshore and about 1½ miles south-eastward of Tanjong Piatoe, are low and wooded; Tanjong Awoeran (Awuran), 2½ miles south-eastward of Tanjong

Chart 2056.

Piatoe, is high and fairly prominent; Tanjong Kapo is a high and prominent point 1½ miles farther south-eastward.

Baai van Banten, entered between Tanjong Kapo and Tanjong Pontang, 8¾ miles eastward, is of no importance for general shipping. The hilly land on the western side terminates at Santri, a prominent hill, 315 feet (96$^{\text{m}}$0) high, with an isolated tree on its summit, 3 miles south-south-westward of Tanjong Kapo; the remaining shores of the bay are low, marshy, and fringed by a wide mudbank. Tanjong Pontang (*Lat. 5° 56′ S., Long. 106° 16′ E.*) is a low point wooded with high trees, and is formed by the delta of the Tjioedjoeng (Chiujung); the eastern side of this point appears to be extending northward (*see* Caution on page 72).

Several islets lie in the bay. Pandjang (Panjang), the largest, is low and wooded, and is the only one that is inhabited; reefs extend for about a quarter of a mile from its southern side. Pamoejan (Pamuyan) besar lies about 2¾ miles eastward of Pandjang, and is also low and wooded, with a noticeable clump of trees in the middle. Lima eilanden, with foul ground around them, lie about one mile offshore at the head of the bay.

Karang Antoe (Antu), situated on the canalled mouth of Kali Banten, which flows out at the head of the bay, is the port of Serang, the capital of the Bantam Residency, situated about 5 miles inland. There are Government warehouses here, and a harbour for praus; it is connected by rail with Batavia.

The roadstead off Karang Antoe is continually shoaling, and is now only suitable for small vessels. A vessel, while observing the Caution on page 72, can safely enter the bay by passing either eastward or westward of Pamoejan besar; owing to fishing stakes, navigation within the 5-fathom (9$^{\text{m}}$1) line is sometimes difficult. The west-going stream sets against and around Tanjong Pontang, into the bay, and thence southward and westward of Pandjang.

A light is exhibited on the western side of the entrance to Karang Antoe.

Off-lying island.—Light.—Babi, an island, about 7½ miles northward of Tanjong Pontang, is low and thickly wooded; it is fringed by a reef extending about 2 cables from its western and eastern extremities, and from half to one cable from its northern and southern sides.

A light is exhibited, at an elevation of 57 feet (17$^{\text{m}}$4), from a white iron framework structure, 64 feet (19$^{\text{m}}$5) in height, on the southern side of Babi.

Charts 933, 2056.

Coast.—Between Tanjong Pontang and Tanjong Kait, 16½ miles eastward, the coast forms a bight, in which are the villages Lontar, Pasir Pandjang (Panjang), Tanara, on the Tjidoerian (Chidurian), and Maoek (Mauk), the positions of which may best be seen on the chart. A prominent group of trees, visible about 8 miles, stands close eastward of the mouth of the Tjidoerian, but its position has not been accurately determined; another group stands near Maoek village, about 3½ miles south-westward of Tanjong Kait, and is known locally as "Valsch Menscheneter," as vessels coming from westward sight it at the same time as the trees on Menscheneter eiland and may confuse the two (*see* page 76).

Tjangkir (Changkir), an island, situated close offshore, about 6 miles

Charts 1653a, 941a, 1263.

Charts 933, 2056.

west-south-westward of Tanjong Kait, is wooded with high trees, but is sometimes difficult to distinguish from the coast; a reef extends nearly 2 cables eastward from the island, and two reefs which dry lie 4 and 8 cables, respectively, northward of it. Off Tanara, the mudbank fronting the coast, with depths of less than 3 fathoms (5^m5) over it, extends nearly 3 miles offshore.

There is anchorage off the mouth of the Tjidoerian, in depths of from 2 to 4 fathoms (3^m7 to 7^m3); the prominent group of trees eastward of the mouth kept between the bearings 202° and 226° leads between the mudbank off Tanara and the two drying reefs northward of Tjangkir.

Chart 933.

Tanjong Kait (*Lat. 6° 01′ E., Long. 106° 32′ E.*) is a low point, difficult to distinguish from westward, but plainly discernible from eastward; Toasia village is situated on the western side, and Kait village on the eastern side. A prominent tree, visible from all directions, stands about 6 cables southward of the point. For Rif van Menscheneter and island, *see* page 76.

Between Tanjong Kait and Kramat village, about 3½ miles south-eastward, paddy-fields run down close to the beach, but farther eastward the coast consists of a strip of marshy land with some fairly high trees inland. There are several villages along the coast, and these can generally be discerned from seaward by the coconut trees growing around them. The only river of any importance is the Tjisadané (Chisadane), which enters the sea eastward of Kramat by five mouths, in which, however, there is only a depth of about one foot (0^m3).

Tanjong Pasir, 8½ miles eastward of Tanjong Kait, is difficult to distinguish from the low uniform coast on either side of it; Tandjoeng Pasir, with coconut trees around it, is situated on the western side of the point. The reef, extending northward from Tanjong Pasir, is described on page 77.

WESTERN APPROACHES TO TANDJOENG PRIOK HAVEN.—Vessels bound for Tandjoeng Priok haven from Sunda strait have the choice of two channels leading between the Java coast and Duizend eilanden. These are known as the Outer and Inner channels; the latter, nearest to the Java coast, provides the shorter route, but can only be used by day.

Nearly all the islands adjacent to both channels are low and flat, but they can usually be plainly seen owing to their thick overgrowth, and there is also slight vegetation on the broad coastal reefs generally surrounding them. There are numerous reefs on either side of the channels, but those with depths of less than 3 fathoms (5^m5) over them are usually marked by discoloration; the water in the Inner channel is not so clear as that in the Outer channel.

Outer channel.—Islands and dangers.—Lights.—Buoyage.—Beacon.—Vessels proceeding to Tandjoeng Priok haven from westward, and choosing the Outer channel, usually pass southward of Babi (chart 2056), thence between the Hoorn and Agenieten eilanden, and thence southward of Edam (page 75). The principal islands and reefs along this channel are as follows:—

Hoorn eilanden lie with their eastern end about 12 miles northward of Tarjong Kait, and consist of three islands, the two western, Tidoeng

Charts 2056, 1653a, 941a, 1263.

Chart 933.

besar (Great Tidung) and Tidoeng kechil (Little Tidung), lying on a narrow coral reef which partly dries. Pajoeng (Payung) is separated from Tidoeng kechil by a clear channel, about 7 cables wide, except for a detached reef, which partly dries, about 3½ cables northward of Pajoeng. The coconut trees on Tidoeng besar and Tidoeng kechil can usually be seen from a distance of 10 miles. A conspicuous tree stands on the north-eastern edge of the reef surrounding Pajoeng. The islands are inhabited by fishermen. *See* view on chart 933.

Dangers extend 2½ miles west-north-westward from Tidoeng besar; Kerbau (Karbau) rif, the outer of these, has a depth of 1¾ fathoms ($3^{m}2$) over it, and lies well northward of the route through Outer channel. Ajer (Ayer) and Sekati (chart 2056), the two southernmost of Duizend eilanden, and situated about 3¾ miles and 4¾ miles, respectively, north-eastward of Pajoeng, can be identified by the high trees on them. *See* page 78.

A light (*Lat. 5° 49′ S., Long. 106° 33′ E.*) is exhibited, at an elevation of 60 feet ($18^{m}3$), from a white iron framework structure, 65 feet ($19^{m}8$) in height, on the southern side of Pajoeng. In 1946, the light-structure was obscured by trees. A light is also exhibited, at an elevation of 4 feet ($1^{m}2$), from a post, on the reef about 1¼ cables southward of the light-structure on Pajoeng.

Karang Purak, with a depth of 3 fathoms ($5^{m}5$) over it, is the northernmost danger of Struisvogel rocks, and lies about 6 miles south-westward of Pajoeng light-structure.

Agenieten eilanden, the westernmost of which lies about 2½ miles south-south-eastward of Pajoeng, consist of five low, thickly wooded islands lying together on a steep-to reef, on which are numerous patches which dry and trees standing in the water; the edge of this reef is always plainly marked by discoloration. Pari, the largest island of the group, is inhabited by a few fishermen, whose village can be identified by its coconut trees. Djong (Jong), about 9 cables eastward of Pari, is merely a patch of coral and sand, always above water, lying on a steep-to reef; a reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies about 2¾ cables east-north-eastward of Djong.

The area between Agenieten eilanden and Middelburg, an island about 8 miles south-eastward, is encumbered with numerous reefs and should be avoided.

Dapoer (Dapur), about 3½ miles north-eastward of Middelburg, is a low islet covered with bushes; Gosong, a reef, with a depth of less than 6 feet ($1^{m}6$) over it, lies 4 cables north-eastward of Dapoer, and there are three reefs between. A 6-fathom ($11^{m}0$) patch lies 4½ cables northward of Dapoer.

Edam, an island, about 7½ miles east-south-eastward of Dapoer, is covered with tall trees; there is a stone landing pier near the lighthouse. The fringing reef extends about a quarter of a cable outside the head of the pier.

A light is exhibited, at an elevation of 168 feet ($51^{m}2$), from a white iron tower, 164 feet ($50^{m}0$) in height, on the western side of Edam.

Edam rif, half a mile northward of Edam, is steep-to, and has a sandbank, which dries, on its southern side; there is a clear passage between the reef and the island. A beacon, surmounted by a white ball, marks the northern side of Edam rif.

An obstruction was reported, in 1949, to lie about 1½ miles northward of Edam.

Charts 2056, 1653a, 941a, 1263.

Chart 933.

A light-buoy, painted black, exhibiting a *white flashing* light of *four seconds* duration, *every sixteen seconds*, is moored about 1½ miles north-north-westward of Tanjong Krawang, situated 11½ miles north-eastward of the entrance to Tandjoeng Priok haven.

Alkmaar, about 1½ miles southward of Edam, is wooded with low trees. Enkhuizen, 1½ miles south-westward of Alkmaar, has a conspicuous cupola-shaped tree on the northern edge of the surrounding reef. Leiden, about 1½ miles south-south-eastward of Enkhuizen, is almost entirely covered with bushes; Amstel, a shoal, with a depth of 1½ fathoms (2^{m}7) over it, lies close eastward of Leiden (*Lat. 6° 02′ S., Long. 106° 51′ E.*).

Directions for the Outer channel are given on page 84.

Inner channel.—Islands and dangers.—Beacons.—Buoys.— The Inner channel to Tandjoeng Priok haven is bordered by the following islands and reefs:—

Struisvogel rocks, the westernmost dangers on the northern side of the Inner channel, comprises a group of six small coral reefs, the southernmost and shoalest being Karang besar, with a depth of 1¾ fathoms (3^{m}2) over it, situated 8 miles north-north-westward of Tanjong Kait; Karang Purak, the northernmost, has been described with the Outer channel on page 75.

Karang Laut, about 2 miles eastward of Karang besar, is a very steep-to reef having two heads, with depths of 3¼ and 4¼ fathoms (5^{m}9 and 7^{m}8) over them, respectively.

Tongara, about 6 miles northward of Tanjong Kait, is a small, steep-to reef, with a depth of 3 fathoms (5^{m}5) over it; it is not always marked by discoloration.

Menscheneter, 3 miles northward of Tanjong Kait, is a low, uninhabited island wooded with high trees; it is visible about 12 miles, and vessels from westward may expect to sight it soon after passing Babi. There is no passage between the island and the main coast, as Rif van Menscheneter extends nearly 4 miles northward from Tanjong Kait, with depths of less than 6 fathoms (11^{m}0); this reef consists of hard sand covered with a layer of mud, with patches of stones, which dry in places, and break at times; it is steep-to at its northern extremity. Karang di Tenga, with a least depth of 1¼ fathoms (2^{m}3) over it, lies off the eastern side of Rif van Menscheneter and about 2½ miles east-north-eastward of Tanjong Kait.

Pedjinab (Pedynab), on the northern side of the Inner channel, 3 miles north-eastward of Menscheneter, has a depth of 3 feet (0^{m}9) over it, and is marked by a black iron beacon.

Groot Kombuis, about 5½ miles north-north-eastward of Tanjong Kait, consists of a group of three low islands wooded with fairly high trees, visible from a distance of about 9 miles; there is a prominent tree with two crowns, one above the other, on the south-eastern island. The reef surrounding the island dries in places, and there are patches of vegetation on it; on the northern side it is narrow and steep-to, but on the western side dangers extend nearly to Pedjinab.

Klein Kombuis, about 1¾ miles eastward of the eastern Groot Kombuis, is a low island covered with high trees, visible about 12 miles.

Karang Tiga, about one mile southward of Klein Kombuis, has a depth of 3¼ fathoms (5^{m}9) over it. Between Karang Tiga and Groot

Charts 2056, 1653a, 941a, 1263.

Chart 933.

Kombuis are Hordyk, with a depth of 2¼ fathoms (4^{m}1) over it, and Loembang (Lumbang), with a depth of 1½ fathoms (2^{m}7) over it; a 3-fathom (5^{m}5) patch lies about midway between Hordyk and Klein Kombuis. Pari, with a depth of 3¾ fathoms (6^{m}9) over it, lies about three-quarters of a mile southward of the eastern extremity of Klein Kombuis, and a 4¼-fathom (7^{m}8) patch lies about one mile south-south-eastward of the same point. Meinderts droogte, with a depth of 1½ fathoms (2^{m}7) over it, lies about 2 miles south-eastward of Klein Kombuis (*Lat.* 5° 57′ *S., Long.* 106° 38′ *E.*), and is marked on its southern side by a black iron cone beacon.

Middelburg and Amsterdam are islands somewhat similar in appearance to Klein Kombuis, lying on the northern side of the Inner channel, about 2 miles north-north-eastward of Tanjong Pasir (page 74). The approach to Amsterdam is prohibited, as a rare species of birds is found there. The remains of a sunken dock lie on the southern side of Amsterdam, which must be given a wide berth by vessels passing. The area around the island is a firing ground for aircraft.

A group of shoals lies between Meinderts and Middelberg. Karang Ajer, on the south-western edge of this group, has a depth of 2¾ fathoms (5^{m}0) over it. Karang Ketapang, with a depth of 2¾ fathoms (5^{m}0) over it, lies on the southern side of the channel, 9 cables west-south-westward of Middelburg. Sonko, a reef, with a depth of 3¾ fathoms (6^{m}9) over it, lies 2 cables southward of Karang Ketapang.

An unofficial beacon marks Wrange klip, a rock, with a depth of less than 6 feet (1^{m}8) over it, about 2 cables south-westward of the western extremity of Middelburg, and a wooden unofficial beacon marks the south-eastern edge of the reef which fringes the island.

A reef extends about 1½ miles northward from Tanjong Pasir, and consists of hard sand and mud; near the northern extremity, which is steep-to, are two patches of hard sand and stones, which usually break at high water, and are marked by a white iron beacon surmounted by a ball. The land on either side of the point is low and uniformly wooded.

Schiedam, about 3 miles eastward of Tanjong Pasir, and on the southern side of the Inner channel, is a bare sandbank. Rotterdam is a wooded island fringed by a reef which dries; Oebi (Ubi), a rock, with a depth of 1¼ fathoms (2^{m}3) over it, lies 3 cables eastward of Rotterdam, and there are other reefs southward of it. Oebi is marked on its northern side by a white iron beacon.

Haarlem, on the northern side of the Inner channel, and about 3 miles eastward of Amsterdam, is wooded with low trees, and fringed by a reef which dries; a 3-fathom (5^{m}5) patch lies about 2 cables northward of the islet. Monnikendam, a reef, about 8½ cables eastward of Haarlem, has a patch of sand, which dries, on it, and which is marked on its northern side by a beacon; there is a wreck on the northern side. Hoorn, 1½ miles south-eastward of Haarlem, is wooded with tall trees. Ajer (Ayer), a rock, with a depth of 5 feet (1^{m}5) over it, lies 3½ cables westward of Hoorn.

Wapen van Purmerend is a bank with a depth of 3 feet (0^{m}9) over it, lying on the southern side of the Inner channel, about 6 miles east-south-eastward of Tanjong Pasir; it is marked on its northern side by a white iron beacon surmounted by a ball, and on its southern side by a beacon surmounted by a black truncated cone.

Charts 2056, 1653a, 941a, 1263.

Chart 2056.

NORTHERN APPROACH TO TANDJOENG PRIOK HAVEN.—Lights.—Noordwachter, which lies on the western side of the route taken by vessels bound for Tandjoeng Priok haven from Straat Banka, is described on page 70.

Arnemuiden droogte, about 17 miles eastward of Noordwachter, is a coral patch with a small bank of white coral sand, which dries, on it; there are depths of about 11 fathoms (20^{m}1) close around the reef.

A light (*Lat. 5° 13′ S., Long. 106° 44′ E.*) is exhibited, at an elevation of 31 feet (9^{m}4), from a black framework beacon, with a spherical topmark, on black piles, 26 feet (7^{m}9) in height, on Arnemuiden droogte.

Etna droogte, about 11 miles south-eastward of Arnemuiden droogte, is also a coral reef with a patch, which dries, in the middle.

A light is exhibited, at an elevation of 48 feet (14^{m}6), from a white iron framework structure, 33 feet (10^{m}1) in height, on Etna droogte.

Eastern side of Duizend eilanden.—Dangers.—Noordoost (Northeast) eiland, 16½ miles south-south-eastward of Noordwachter, is densely wooded with high trees. Boeton, about 1½ miles westward of Noordoost eiland, is a patch of coral rocks with a prominent tree with spreading branches on it.

Djagoeng (Jajung), an islet, about 2½ miles south-westward of Noordoost eiland, is densely wooded with high trees. Majang (Mayang), with a depth of 4¼ fathoms (7^{m}8) over it, lies 2¼ miles south-eastward of Noordoost eiland; it is not marked by discoloration or tide-rips.

Ringit, 2 miles southward of Noordoost eiland, is densely wooded with high trees. Laga eilanden, about 2 miles southward of Ringit, are covered with bushes. Petoendang (Petundang) eilanden, about 5 miles southward of Ringit, are wooded with high trees; some small trees on the edge of the fringing reef appear as islets from a distance. Belanda, 1¼ miles south-eastward of Petoendang eilanden, may be identified by a clump of casuarina trees. Pemadaran, 2 miles south-south-westward of Belanda, is covered with low trees. Opak kechil, about 2½ miles southward of Pemadaran, has two trees with fan-shaped tops, on it.

Tjonkak (Chonkak) and Simpit, near the southern end of the group and 4½ and 6 miles, respectively, southward of Pemadaran, are not very noticeable, but the reefs surrounding them are very discoloured and break with any sea. Lang, about 2 miles east-south-eastward of Simpit, is densely covered with coconut trees. Sekati, about three-quarters of a mile southward of Lang, is very prominent owing to a high tree on its western side, giving the island the appearance of a right-angled triangle from a distance, the top of the tree being the apex. Ajer (Ayer), about 2 miles south-westward of Lang, has a high tree with spreading branches on its northern extremity, and two coconut trees, projecting well above the surrounding wood, on its southern side. Karang Bras, 1½ miles west-south-westward of Ajer, is covered with undergrowth.

Zuidwachter.—Zuidwachter (South Watcher), about 6½ miles north-eastward of Lang, is densely wooded with high trees; it is visible from a distance of about 14 miles.

Chart 933.

Nassau and Jawiel reefs.—Nassau reef, with a depth of 1½ fathoms (2^{m}7) over it, lies about 9 miles south-eastward of Zuidwachter, and near the usual route taken by vessels bound to Tandjoeng Priok haven from Noordwachter; the discoloration can be seen from a distance of about half a mile.

Jawiel reef, about 1½ miles southward of Nassau reef, has a depth of 3¼ fathoms (5m9) over it. Between Nassau reef and Agenieten eilanden (page 75) there are several reefs with a least depth of 6½ fathoms (11m9) over them, the positions of which may best be seen on the chart.

The whole of Alkmaar, bearing about 184°, open eastward of Edam (*Lat. 5° 57′ S., Long. 106° 51′ E.*), leads over 2 miles eastward of Nassau and Jawiel reefs.

COAST.—Between Tanjong Pasir (page 74) and Tanjong Krawang, 20 miles east-north-eastward, the coast forms a bay, at the head of which are situated the town of Batavia and the artificial harbour of Tandjoeng Priok haven. The shore of this bay is low and uniformly wooded; far inland are the mountains described on page 72.

Tanjong Krawang, the eastern point of the bay, is low, but may be readily identified by some bare trees on its western side and some high trees close eastward, which are visible about 13 miles. The mudbank fringing the point is extending seaward, and the depths within the line joining Tandjoeng Priok haven and Tanjong Krawang appear to be decreasing. In 1934, Tanjong Krawang and the coast for 6 miles southward were reported to be extending northward and westward, respectively. There are usually numerous fishing stakes in this part of the bay.

Islands and reefs.—Beacons.—Buoyage.—Eastward of Tanjong Pasir, and separated from it by a passage which, since the depths appear to be decreasing, should not be used without local knowledge, is a group of islets and reefs; Schiedam and Rotterdam, the northern of these, with the adjacent reefs, are described on page 77. Onrust, Kuiper, Kerkhof, and Purmerend are low, wooded islets; the Quarantine station is situated on Onrust, and the disinfecting station on Kuiper. A pier extends from the south-western side of the latter island, and there are some mooring buoys off it. For directions for Quarantine station, *see* page 85.

Mathilde, a reef, about 7 cables north-westward of Onrust, is marked by a white beacon surmounted by a ball.

A black beacon, surmounted by two truncated cones, marks the south-western side of De Steen, about midway between Mathilde and Onrust.

A beacon, surmounted by a black triangle, marks the western side of the reef fringing Kuiper; a black cone beacon marks the south-eastern edge of this reef; the north-western side of this reef was reported in 1947 to have extended northward, and is marked at its outer end by a white drum. A black cone beacon marks the northern side of the detached reef close eastward of Kuiper. A white beacon, surmounted by a ball, stands on the north-eastern side of Purmerend rif, about 3½ cables south-eastward of Purmerend eiland, and a black beacon with a truncated cone, marks the south-western side.

Wapen van Purmerend and the beacons marking it, about 1½ miles eastward of Purmerend eiland, are described on page 77.

Reigersdaal, a reef marked by a white beacon surmounted by a ball,

Chart 933.

lies about 1¾ miles southward of Purmerend. The beacon should not be approached within about half a cable.

Several reefs lie at the head of the bay westward of Tandjoeng Priok haven. The principal of these are:—Rijnlands (Rynlands) droogte, with a depth of 2½ fathoms ($4^{m}6$) over it, about 3¾ miles south-eastward of Purmerend. Karang Pipa, with a depth of 1½ fathoms ($2^{m}7$) over it, and marked by a black cone beacon, lies about one mile eastward of Rijnlands droogte. Neptunus droogte, marked on its northern side by an iron beacon surmounted by two white balls, and on its south-eastern side by a black cone beacon, lies about 1½ miles east-north-eastward of Rijnlands droogte. Neerstuk, marked on its north-western side by a white beacon surmounted by a ball, and on its southern side by a black cone beacon, lies about 7 cables south-eastward of Neptunus droogte (*Lat. 6° 04′ S., Long. 106° 49′ E.*).

Vader Smit lies about 2 miles eastward of Neptunus droogte and is marked on its southern side by a black cone beacon. Van Dorth, with a depth of 1¾ fathoms ($3^{m}2$) over it, and marked by a black and white chequered light-buoy, exhibiting a *white flashing* light *every nine seconds*, lies about one mile eastward of Vader Smit. Telegraaf, a reef, with a depth of 2½ fathoms ($4^{m}6$) over it, and marked by a black can buoy with a truncated cone, on its southern side.

St. Nicolaas droogte, with a depth of 4¼ fathoms ($7^{m}8$) over it, lies about 2½ miles east-north-eastward of the head of the eastern mole at Tandjoeng Priok haven. Broenda (Brunda) rif, with a depth of 3¼ fathoms ($5^{m}9$) over it, and marked on its southern side by a black can buoy with a truncated cone, lies about half a mile southward of St. Nicolaas droogte.

A black can buoy and a white conical buoy are moored, respectively, about 1½ miles east-north-eastward and one mile eastward of the head of the eastern mole.

A white iron ball beacon and a black iron cone beacon stand close eastward of Tandjoeng Priok haven, about 1¼ miles south-south-eastward of the head of the eastern mole.

Roadsteads.—The roadsteads of Batavia and Tandjoeng Priok haven are bounded as follows:—

On the north; by a line joining Tanjong Krawang and the northern extremity of Edam;

On the west; by a line joining the eastern extremity of Edam and the eastern entrance point of the eastern mouth of Tjiangké (Chiangké);

On the south and east; by the low water line between Tjiangké and Tanjong Krawang.

The old roadstead of Batavia, southward of Rijnlands droogte, is now little used. The best anchorage is in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$) northward of the canal leading to the old town of Batavia (*see* pages 81, 82); the holding ground is very good, so that there is little chance of dragging even in squalls during the west monsoon. During a long stay, the anchors should be occasionally lifted, as they are liable to sink very deep in the muddy bottom.

The usual anchorage in Reede Tandjoeng Priok is northward of the harbour, in depths of from 5½ to 7 fathoms ($10^{m}1$ to $12^{m}8$), with very good holding ground. The shore bank, with depths of less than 3 fathoms ($5^{m}5$) over it, extends some distance out eastward of the harbour, and there are numerous fishing stakes eastward of this bank.

Charts 2056, 1653a, 941a, 1263.

Chart 933.

Vessels should keep northward of the alignment—Batavia light-tower (*Lat. 6° 06′ S., Long. 106° 48′ E.*) in line with the light-structure on the head of the western mole at Tandjoeng Priok haven, bearing 252°. Vessels usually proceed direct inside the harbour.

Aircraft landing areas.—Buoyage.—Regulations.—Signals.— By day, commercial aircraft may land on or take off from any part of the roadsteads or basins, with the exception of the first inner harbour (page 83). At night, Naval aircraft may land in an area, indicated by pecked lines on the chart, westward of the western mole; the north-western corner is marked by a black can buoy, the north-eastern corner by the light-buoy marking Van Dorth rif, and the south-eastern and south-western corners each by a red and white can buoy; when night flying is taking place, a *white fixed* light is exhibited from each of the south-western and south-eastern buoys and also from the buoy marking Telegraaf rif (*Lat. 6° 04′ S., Long. 106° 53′ E.*).

No vessel, other than one authorised by the Naval authorities, may approach a Naval aircraft within a distance of 30 yards (27^{m}4).

The ends of the area on or from which commercial aircraft are about to land or take off are marked by motor boats which will display a green flag when the area is clear and a red flag when it is not clear. In addition, one red ball will be displayed from the lookout station ashore for half-an-hour before the arrival of an aircraft, and two red balls for ten minutes before its departure.

Prohibited areas.—Anchoring and fishing are prohibited within the following areas, which are indicated by pecked lines on the chart:—

An area westward of Tandjoeng Priok haven between Neptunus droogte and the coast, and an area adjoining it extending about 10½ miles north-north-eastward from the same reef.

A prohibited area extending eastward from the coast about 3 miles south-eastward of Tanjong Pasir.

An area extending northward from the coast close eastward of Tandjoeng Priok haven.

Batavia.—Outside Oost-Indische Archipel the name " Batavia " is generally considered to include all the portions of the towns and suburbs, with Tandjoeng Priok haven, lying at the head of the bay between Tanjong Pasir and Tanjong Krawang; as such Batavia is the capital of Oost-Indische Archipel. It was founded in 1619, and is one of the largest commercial centres in the east. The old town originally stood on the seashore, but the foreshore has advanced so much, that it is now one mile inland. In 1947 the population of Batavia was about 260,000.

In Oost-Indische Archipel, both for Government and private purposes, the name " Batavia " is used solely to denote the old or lower town, which contains the offices of the Europeans, the town hall, and Chinese and native quarters. Weltevreden is the name given to the new or upper town, immediately southward of Batavia; it contains the main portion of the Government offices, including the head office of navigation, and also houses and offices of Europeans.

The cathedral, which has two spires, and is prominent, the palace of the Governor-general, barracks, various public buildings, and hotels are also situated in Weltevreden; it is a widespreading area of well-designed avenues, planted with shady trees.

Charts 2056, 1653a, 941a, 1263.

Chart 933.

Meester Cornelis, southward of Weltevreden, is mainly a European residential quarter.

A chimney situated on the western side of the town, about 2¼ miles southward of the head of the western mole, and a monument on the coast, about 3½ miles east-south-eastward of the same head, are noticeable when approaching Batavia roadstead.

Canal.—Lights.—The canal leads from the roadstead to the old town; before the construction of Tandjoeng Priok haven it was the highway for inland traffic, and is still largely used by small vessels. In case navigation in or out of the canal is rendered dangerous by a heavy surf, a blue flag is displayed from the old harbour of the lower town, otherwise there is no signal communication.

The canal is formed by two moles projecting about 1½ miles northward from the high water line; there is a passage for boats through the eastern mole. There was a least depth of 4 feet (1^{m}2), in 1947, in the canal.

A light (*Lat. 6° 06′ S., Long. 106° 48′ E.*) is exhibited, at an elevation of 54 feet (16^{m}5), from a stone tower with a red cupola, 62 feet (18^{m}9) in height, on the west mole of Batavia canal, about 3¾ cables from the head.

A light is also exhibited, at an elevation of 15 feet (4^{m}6), from a post on the head of the western mole.

Chart 2056.

A light is exhibited by day and night, at an elevation of 80 feet (24^{m}4), from a white stone tower, about 5¼ miles southward of the head of the western mole; the light is reported to be difficult to distinguish by day.

Chart 933.

Consul.—A consular officer is stationed at Batavia.

Communication.—Radio station.—There is regular communication by vessels of the Koninklijke Paketvaart Maatschappij with Oosthaven, in Sumatra.

There is a radio station at Batavia. *See* page 10.

Chart 933, plan of Tandjoeng Priok haven.

TANDJOENG PRIOK HAVEN. — Lights. — This artificial harbour, which was completed in 1887, comprises an outer and a series of inner harbours. The outer harbour is enclosed by two moles, almost awash at high water; the sea frequently breaks over them in the west monsoon. The channel through the harbour, between the lines of mooring buoys on either side, is maintained at a depth of 31 feet (9^{m}4) at lowest water level by dredging; there is a similar depth in the eastern part of this harbour, where there are six bow and stern moorings at which vessels secure with their heads westward, an anchor being generally used as well. Only vessels which cannot obtain a berth in the inner harbour are moored to the buoys; there are some buoys northward of the signal station (page 84) for Government vessels and vessels undergoing repair.

A light is exhibited, at elevations of 43 and 40 feet (13^{m}1 and 12^{m}2), from a white iron framework structure, 46 feet (14^{m}0) in height, situated on the western and eastern heads, respectively, of the two moles forming the outer harbour of Tandjoeng Priok haven. A light is exhibited on the angle at the southern end of the eastern mole, where the mole changes from a south-easterly to an easterly direction.

Charts 2056, 1653a, 941a, 1263.

Chart 933, plan of Tandjoeng Priok haven.

The inner harbours, consisting of a prau harbour and first, second, and third inner harbours, lie southward of and are entered from the outer harbour; they all have quays where vessels can lie alongside, and are provided with warehouses and appliances for working cargo.

The prau harbour, the western of the inner harbours, has direct communication with the old or lower town of Batavia by means of the ship canal, which enters the western side and is available for small vessels.

In 1949, the depths in the first inner harbour, or No. 1 basin, at mean low water were as follows:—Entrance, 30½ feet (9^{m}2); alongside the eastern and western quays, 27 feet (8^{m}2); alongside the southern quay, 12 feet (3^{m}7).

In the second inner harbour, or No. 2 basin, and third inner harbour, or No. 3 basin, there was a depth of 30 feet (9^{m}1) in the entrances, and also alongside the eastern and western quays.

There are two Government piers on the eastern side of the entrance to the first inner harbour; between these piers and the entrance to a blind canal lying between, and parallel with, the first and second inner harbours, is the Naval quay with coal sheds and oil fuel pipe. Immediately northward of the entrance to the blind canal is a cattle wharf. The railway station is situated on the western side of the first inner harbour, and a new central station has been constructed southward of it; there are two radio masts close north-eastward of the central station (*Lat. 6° 06′ S., Long. 106° 53′ E.*).

As there are no warping buoys in the second inner harbour, tugs must be employed by vessels going alongside and leaving the wharves.

On the outer end of the strip of land between the second and third inner harbours there is a petroleum pier, with a depth of 27 feet (8^{m}2) at lowest water level at the head. In 1945, there was a shoal, with a depth of 25 feet (7^{m}6) over it, nearly one cable north-westward of the head of this pier.

There are several mooring buoys off the head of the petroleum pier and in the third inner harbour. There are also a black conical buoy, a white conical buoy, and a red can buoy in the third inner harbour.

A light is exhibited from a white tower on the western side of the entrance to the first inner harbour, and also on the western side of the entrance to the second inner harbour.

Pilotage.—Pilotage is compulsory for vessels entering Tandjoeng Priok haven. The pilot vessels display a blue flag with a white star by day. At night the steam pilot vessels show a *white* light over a *red* light; the pilot boats only show a *red* light.

The pilot look-out station is situated by the signal station on the eastern side of the entrance to the first inner harbour. For Pilot signals, *see* page 11.

Chart 933.

Tidal streams.—There is practically no tidal stream in the roadstead or off the harbour entrance. A very weak stream sets constantly out of the harbour, usually obliquely across the channel.

Compass adjustment.—The true bearings of the northern spire of the cathedral in Batavia in line with the light-structures on the western and eastern mole-heads at Tandjoeng Priok haven are, respectively, 208° 46′ and 209° 37′.

Charts 2056, 1653a, 941a, 1263.

Chart 933, plan of Tandjoeng Priok haven.

Harbour facilities.—The coal yards, which contain a large stock of coal, are situated on the eastern side of the second inner harbour. Oil fuel can be taken in at the petroleum pier between the second and third inner harbours, and also at certain berths in these harbours.

Water can be obtained at the petroleum pier, and from water praus on special request to the Harbour master.

Large repairs to vessels can be carried out. There is a dry dock and there are three floating docks, details of the largest of which are given in Appendix I, also a patent slip and repair wharf at the small basin westward of the first inner harbour.

There is a floating crane with a lifting capacity of 75 tons, and many stationary cranes, with lifting capacities of from 3 to 25 tons.

Several tugs, equipped for salvage purposes, are available.

Compasses can be tested and sextants examined by the Nautical Institute of the Koninklijke Paketvaart Maatschappij.

There is a medical officer at Tandjoeng Priok haven and a doctor in the service of some of the steamship companies. There is a hospital for infectious cases.

The harbour office is on the western side of the entrance to the second inner harbour.

Signal station.—The signal station (*Lat. 6° 06′ S., Long. 106° 53′ E.*) is situated on the eastern side of the entrance to the first inner harbour.

Communication.—There is communication by steamer and by aircraft with all parts of the world. The harbour is connected by railway with Batavia. The post and telegraph offices are situated near the railway station on the western side of the first inner harbour.

Trade.—The principal exports are rubber, rice, coffee, spices, hides, tea, tapioca, gums, copra, oil cake and motor tyres ; the chief imports are petroleum, coal, iron, piece goods, machinery, automobiles and provisions.

Directions.—*Outer channel.*—The usual route taken by vessels proceeding from Sunda strait to Tandjoeng Priok haven is southward of Babi (chart 2056), and thence fairly close southward of the southern light on Pajoeng, thence continuing eastward until clear of the Agenieten eilanden and Djong. Thence direct for Edam, passing north-eastward of Dapoer and adjacent reefs. When near Edam, course may be altered to pass between Enkhuizen and Alkmaar, and eastward of Leiden and Van Dorth to the harbour.

Charts 933, 2056.

Inner channel.—The Inner channel to Tandjoeng Priok haven should only be taken by day and with sufficient local knowledge. From westward the high trees just eastward of the mouth of the Tjidoerian (page 73) will be sighted when the eastern extremity of Babi bears 000°, and shortly afterwards Hoorn eilanden will be sighted.

When the eastern extremity of Babi bears about 336°, the prominent group of trees near Maoek, the prominent tree southward of Tanjong Kait, and Menscheneter will all be sighted at about the same time. As the group of trees near Maoek has sometimes been mistaken for Menscheneter, the former is also known as " Valsch Menscheneter " ; the trees on Menscheneter have also been occasionally mistaken for Groot Kombuis (page 76) ; the latter is generally sighted about the same time as Klein Kombuis.

Charts 1653a, 941a, 1263.

Chart 933.

Struisvogel rocks separate the Inner from the Outer channel, and vessels should pass southward of the southernmost rock. The track thence is towards Middelburg, passing northward of Rif Van Menscheneter; thence the channel lies between Karang Ketapang and Karang Ajer, or vessels can pass southward of Sonko. The narrow passage between Middelburg and the reef extending northward from Tanjong Pasir is marked on the northern side by the beacon on the reef extending from the south-eastern side of Middelburg, and on the southern side by a white ball beacon. The southern side of Amsterdam should be given a good berth on account of the sunken dock there.

When past Amsterdam course may be shaped to pass between Haarlem and the beacon marking Oebi, thence southward of Hoorn and Leiden. As previously mentioned on page 79, unless thoroughly acquainted with the locality vessels should not attempt the passage along the Java coast, westward of Onrust and Kuiper.

Charts 933, 2056.

From northward.—A vessel bound for Tandjoeng Priok haven from Banka strait should steer for Noordwachter, and when past that island should steer to pass eastward of Duizend eilanden; thence she should steer direct for Edam, so as to pass clear westward of Nassau and Jawiel reefs (page 78), taking care, if of deep draught, to avoid the 6½ fathom (11^{m}9) patches in this vicinity.

At night, without local knowledge, it is preferable to make the light on Etna, and then pass eastward of Nassau and Jawiel reefs by bearing of Edam light.

From eastward and north-eastward.—The vessel should steer for Edam so as to pass Tanjong Krawang in depths of not less than 13 or 14 fathoms (23^{m}8 or 25^{m}6), bearing in mind that this point is extending northward. (*See* page 72.) When steering for Tandjoeng Priok haven, it is advisable to keep westward of the line joining the harbour entrance and Tanjong Krawang.

A vessel entering Tandjoeng Priok haven at night will sight the light at the southern end of the eastern mole when she has passed the southernmost buoy on the eastern side of the outer harbour.

Chart 933.

For Quarantine station.—A vessel proceeding from Tandjoeng Priok haven to the Quarantine station on Onrust should pass eastward and northward of Van Dorth, thence northward of Vader Smit and Neptunus droogte, thence southward of the black cone beacon marking the south-western end of Purmerend rif, southward of Purmerend eiland, thence southward of the black cone beacon on the edge of the reef extending south-eastward from Kuiper. The best anchorage is south-westward of Kuiper pier (*Lat. 6° 02′ S., Long. 106° 44′ E.*).

Charts 1653a, 941a, 1263.

CHAPTER V

NORTH COAST OF JAVA—TANJONG KRAWANG TO SURABAYA, INCLUDING KARIMOEN DJAWA EILANDEN

Chart 1653a.

TANJONG KRAWANG TO TANJONG TANAH.—Coast.—The north coast of Java, from Tanjong Krawang (*Lat. 5° 56′ S., Long. 107° 00′ E.*) to Tanjong Tanah, about 100 miles east-south-eastward, is low, flat, and wooded, showing no prominent objects for identifying the locality. There is very good holding ground everywhere along this part of the coast; close inshore the bottom consists of soft, greyish mud, and blue mud farther offshore, generally mixed with sand and broken shells. This layer of mud has only a slight depth in some places, and rests on a heavy clay ground.

Vessels proceeding from Tandjoeng Priok haven to Surabaya usually round Tanjong Krawang in depths of from 12 to 14 fathoms ($21^{m}9$ to $25^{m}6$), and pass about 4 miles northward of Tanjong Boengin so as to be well clear of Pakis rif; thence about 8 miles northward of Tanjong Sedari, outside Sedari rif, northward of Pamanoekan klip, and southward of Boompjes eiland.

Climate and weather.—*See* page 17.

Monsoon current.—The horizontal movement of the water in the open part of the Java sea is mainly monsoon current and the rate never exceeds 2 knots. In addition, a weak current setting constantly south-south-westward, is noticeable.

Along the Java coast there is practically only monsoon current setting westward from May to October, inclusive; in December, the transition period; in January and February, setting eastward; and at the end of March and beginning of April, the transition period. Land and sea breezes influence the direction. The tidal streams were not observed to have any effect on the current, except perhaps close offshore. Only the current due to the monsoon is felt at the various roadsteads.

Mountains.—At distances from about 25 to 40 miles inland are a number of very high, prominent mountains, but they are rarely seen in the hazy atmosphere of the east monsoon, except occasionally for a few hours in the morning. Pangrango and the other mountains southward of Batavia have been described on page 72. Sanggaboeana (Sanggabuana), about 40 miles southward of Tanjong Krawang, is a round saddle-shaped mountain, 4,234 feet ($1,290^{m}6$) high;

Charts 941a, 1263.

Chart 1653a.

Bongkok, about 7 miles eastward of Sanggaboeana, is 3,163 feet (964^{m}1) high, and the highest peak of a rugged group of mountains. Tangkoeban Prahoe (Tangkuban Prahu), 18 miles south-eastward of Bongkok, is 6,808 feet (2,075^{m}0) high, and has an extinct crater on its eastern side, which has some resemblance to a vessel bottom upwards. Bukit Toenggoel (Tunggul), about 7 miles farther eastward, is a somewhat bare summit, 7,245 feet (2,208^{m}3) high, connected to Tangkoeban Prahoe by a lower ridge. Tampomas, about 15 miles eastward of Bukit Toenggoel, is an isolated, conical mountain 5,522 feet (1,683^{m}1) high, with a round summit. Kromong, about 19 miles south-westward of Tanjong Tanah, is 1,923 feet (586^{m}1) high, and the highest of a group of several peaks close together. Tjareme (Chareme), about 10 miles southward of Kromong, is a truncated, conical volcano, 10,096 feet (3,077^{m}3) high, nearly flat on top and slightly higher on the north-western side; smoke rises occasionally from its crater. *See* view facing page 91.

Chart 2056.

Coast.—Dangers.—Tanjong Boengin, about 6 miles eastward of Tanjong Krawang, is a low, wooded promontory. Boengin (Chibungin), one of the delta arms of the Tjitaroem (Chitarum), discharges at the point and is navigable for praus; there are some high trees on either side of the entrance to Boengin rivier; the bank off the mouth of the river is occasionally marked by heavy surf. Pakis village, 3 miles south-eastward of Tanjong Boengin, may be identified by some high coconut trees; eastward of the village there is a prominent wood of casuarina trees, visible from a distance of 12 miles.

Pakis rif extends about 2¼ miles northward from Tanjong Boengin, with depths of less than 5 fathoms (9^{m}1) over it; it occasionally breaks.

Chart 1653a.

Tanjong Sedari lies about 14½ miles eastward of Tanjong Boengin. Sedari village is situated about 2½ miles westward of Tanjong Sedari, and Tjimara (Chimara) village, about 4½ miles south-eastward; about 2¾ miles farther south-eastward is Sungei Boentoe village, near which is a coconut plantation, with a high casuarina tree in the middle, visible from a distance of 14 miles when the rest of the coast has dipped.

Sedari rif, with a least depth of 23 feet (7^{m}0) over it, is a sandbank lying 6¾ miles north-eastward of Tanjong Sedari; between this reef and the coast there is a ridge with a depth of 16 feet (4^{m}9) over it. There is a passage about one mile wide, with a least depth of 5½ fathoms (10^{m}1) at its south-eastern end, between the two dangers. Small vessels with local knowledge can pass between this ridge and the coast, keeping at a distance of about 2 miles from the coast, where the depth is about 4 fathoms (7^{m}3). Large vessels should pass outside Sedari rif, keeping in depths of not less than 12 or 14 fathoms (22^{m}0 or 25^{m}6).

Sedoelang (Sedulang) riffen extend about 8 miles along the coast in the bight between Tanjong Sedari and Tanjong Bobos (*Lat. 6° 11′ S., Long. 107° 49′ E.*), about 32 miles east-south-eastward; the outermost reef lies 4 miles offshore and 7 miles north-north-westward of the mouth of Tjilamaja (Chilamaya). These reefs were formerly islands, but they have subsided remarkably in latter years. Tjiparage (Chiparage), near the western end of the group and about 8 miles north-westward of the mouth of the Tjilamaja, is a sandbank above water; on Goendoel Tjiparage, about half a mile south-south-westward of it,

Charts 1066, 941a, 1263.

Chart 1653a.

are some black rocks, which dry. Goendoel Pasir Poetih, about 2½ miles eastward of Tjiparage, has a white coral patch on it, and covers at high water; Pasir Poetih, three-quarters of a mile southward of it, dries over a great extent, and has some bushes on its northern side, and a small white sandbank on its southern side, nearly always above water. Djambatan, at the eastern end of the group and about 4½ miles northward of the mouth of the Tjilamaja, is a reef which dries, which often breaks heavily at high water. Most of the remainder are dangerous coral reefs with large rocks on them, and some of them are only occasionally marked by surf or discoloration.

Sedoelang riffen lie well southward of the route of large vessels; coasting vessels may avoid them by keeping in depths of not less than 10 fathoms ($18^{m}3$).

Tjiasem (Chiasem) baai is entered between Sedoelang riffen and Tanjong Pamanoekan (Pamanukan), about 9 miles eastward. Tanjong Pamanoekan and Tanjong Bobos are both low, but from eastward or westward the former appears as a steep point owing to the heavy growth of trees on it. Several small rivers flow into the bay, but they are only navigable for praus. Tjilamaja (Chilamaya) village, where there is a railway station, is situated about 2 miles up the river of the same name, the western of these rivers, and Tjiasem (Chiasem) village is situated nearly 5 miles up the river of that name; there are some high trees at the entrance to the latter river, visible from a distance of 12 miles. The Tjikamal, the western delta arm of the Tjipoenegara, flows out about 2 miles eastward of the mouth of the Tjiasem, and is used by praus to reach Pamanoekan village during the east monsoon.

Tjiasem (Chiasem) rif, with a depth of 2½ fathoms ($4^{m}6$) over it, is a small coral rock lying nearly in the middle of Tjiasem baai and about 3½ miles north-eastward of the mouth of the Tjilamaja.

There is convenient anchorage, in a depth of about 4 fathoms ($7^{m}3$), with the mouth of the Tjilamaja bearing 226°; vessels approaching on this bearing will pass north-westward of Tjiasem rif. There is also anchorage northward of the mouth of the Tjiasem, but there is good anchoring ground everywhere, and the coast can be safely approached by sounding; vessels lie somewhat sheltered from the easterly swell, in depths of from 2¾ to 3¾ fathoms ($5^{m}0$ to $6^{m}9$).

Chart 932, plan of Pamanukan anchorage.

Reede Pamanoekan.—Reede Pamanoekan (Pamanukan), bounded by the parallel of 6° 09′ S. and the meridians of 107° 41′ E. and 107° 54′ E., lies on the eastern side of Tanjong Bobos (*Lat. 6° 11′ S., Long. 107° 49′ E.*) off the eastern mouth of Kali Bobos. A pier extends in a northerly direction from each side of the entrance to this river, forming a canal with a navigable width of a quarter of a cable and a least depth of 1½ feet ($0^{m}5$). A hut, with a white roof, stands on the eastern side of the entrance to the river.

Praus can reach Pamanoekan, about 7 miles up the river. There is telephonic communication with Pamanoekan from the hut mentioned above.

Chart 1653a.

Outlying danger.—Light.—Pamanoekan (Pamanukan) klip, about 10 miles north-north-eastward of Tanjong Bobos, is a steep-to coral rock. Tanjong Pamanoekan is only just visible from the rock, but the prominent group of trees near Tanjong Bobos can be clearly seen.

Charts 1066, 941a, 1263.

Chart 1653a.

A light is exhibited, at an elevation of 22 feet ($6^{m}7$), from a black beacon, 6 feet ($1^{m}8$) in height, on Pamanoekan klip.

Coast.—The coast between Tanjong Bobos and Tanjong Sentigi, about 22 miles east-south-eastward, is well wooded, and some small rivers discharge into the sea, near which are some villages. Kali Sewoe, containing oyster beds near its mouth, flows out about 8 miles south-eastward of Tanjong Bobos and is salt for some distance up; it has a bar with a depth of from one to 2 feet ($0^{m}3$ to $0^{m}6$) over it; Patimban village is situated on the western side of the mouth, and Oedjoeng (Ujung) Gebang village, readily identified by a group of tall coconut trees, on the eastern side. Eretan village, about 17 miles east-south-eastward of Tanjong Bobos, may be identified by the red roofs of its houses and by a prominent tree, visible 12 miles. Kali Kandanghauer flows out about one mile east-south-eastward of Eretan village, and about 4 miles farther in the same direction is the mouth of Kali Tempalang, rendered prominent by a group of casuarina trees.

Tjimara (Chimara) village is situated some distance inland about 3¼ miles southward of Tanjong Sentigi. A canal for praus and small vessels leads from here to Losarang village, about 4½ miles south-south-westward; the entrance is marked by a flagstaff and a beacon surmounted by a triangle. Vessels can anchor, in a depth of 4¾ fathoms ($8^{m}7$), about 2 miles north-westward of the flagstaff; or closer in, according to their draught, but it should be remembered that the depths decrease rapidly within the 3-fathom ($5^{m}5$) line. Vessels making for this anchorage from Tanjong Bobos can safely follow the coast by sounding.

Tanjong Sentigi and Tanjong Indramajoe (Indramayu), about 8½ miles east-north-eastward, are low and form the north-western and north-eastern points, respectively, of the delta of Kali Tjimanoek; a bank of sand and mud, marked by brown-coloured water, extends from them, and deep-draught vessels should not approach within depths of 12 fathoms ($21^{m}9$); *see* caution on page 72. In November, an east-going monsoon current has been observed setting past Tanjong Indramajoe at a rate of 2 knots. There are a couple of prominent houses at the entrance to the Tjimanoek, about midway between Tanjong Sentigi and Tanjong Indramajoe; praus can only pass in or out of the river at high water.

Indramajoe (Indramayu) town, situated about 10 miles up the Tjimanoek, can only be reached by small craft; it is connected to the railway and to the general telegraph system. Provisions can be obtained.

A conical buoy surmounted by a ball, painted in red and black bands, is moored off the entrance to the Tjimanoek.

Reede Indramajoe is bounded by the parallel of 6° 12′ S., and by the meridians of Tanjong Sentigi and Tanjong Indramajoe (*Lat. 6° 14′ S., Long. 108° 18′ E.*).

Charts 1653a, 1653b.

Outlying island and dangers.—Light.—Boompjes eiland, 18½ miles northward of Tanjong Indramajoe, is a densely wooded island, fringed by a steep-to reef which partly dries, extending about 3 cables offshore. A stone pier, with a flagstaff at its root, extends from the southern side of the island, and serves as a landing place for boats;

Charts 1653a, 1653b.

with a heavy sea it is safer to land on the reef on the lee side of the island. Vessels usually pass southward of this island.

A light is exhibited, at an elevation of 175 feet ($53^{m}3$), from a white iron framework tower, 164 feet ($50^{m}0$) in height, on the southern side of Boompjes eiland.

Midden rif (Middle reef), about 4 miles northward of Boompjes eiland, is a very steep-to coral atoll usually plainly marked by discoloration; at low water some rocks dry along the edge, but they are all covered at half tide. In the lagoon of this atoll there is a depth of about 15 fathoms ($27^{m}4$). There is a clear channel between this reef and Boompjes eiland.

Noorder rif (North reef) lies about 8 miles north-north-eastward of Boompjes eiland, and is similar to Midden rif; there is a depth of about 7 fathoms ($12^{m}8$) in the lagoon. The channel between Noorder rif and Midden rif is clear of dangers.

Winds.—At Boompjes eiland, from July to September, the mean directions of the wind are as follows: at 0900, 136°; at 1400, 104°, and at 1800, 078°. In January and February the mean directions at the same times are 279°, 297°, and 297°.

The land and sea breezes set in a little later than near the Java coast.

Coast.—There are several villages along the coast between Tanjong Indramajoe and Tanjong Tanah, a low, wooded point about 20 miles south-eastward. Anchorage may be obtained north-westward of Tanjong Tanah, in depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$), with the high white chimney of Karangampel sugar factory, 5½ miles westward of Tanjong Tanah, in line with Dadap godown, with a red roof, situated on the coast, bearing 200°.

Chart 1653b.

TANJONG TANAH TO TANJONG API API ANOM.—Coast.—The coast between Tanjong Tanah and Cheribon, 14½ miles southward, continues to be flat, thence eastward the mountains approach nearer to the coast, and in the vicinity of Tanjong Tjelong (Chelong), about 82 miles eastward of Cheribon, lie close to the sea. Farther eastward the mountains are again farther inland, and north-eastward of Semarang (page 97), a great part of the coast consists of low land with a monotonous row of low trees. Eastward of Tanjong Djati (Jati), about 35 miles north-eastward of Semarang, the coast again rises rapidly, especially southward of Mandalika, about 12 miles east-north-eastward of Tanjong Djati, where there are some prominent hills close by the sea.

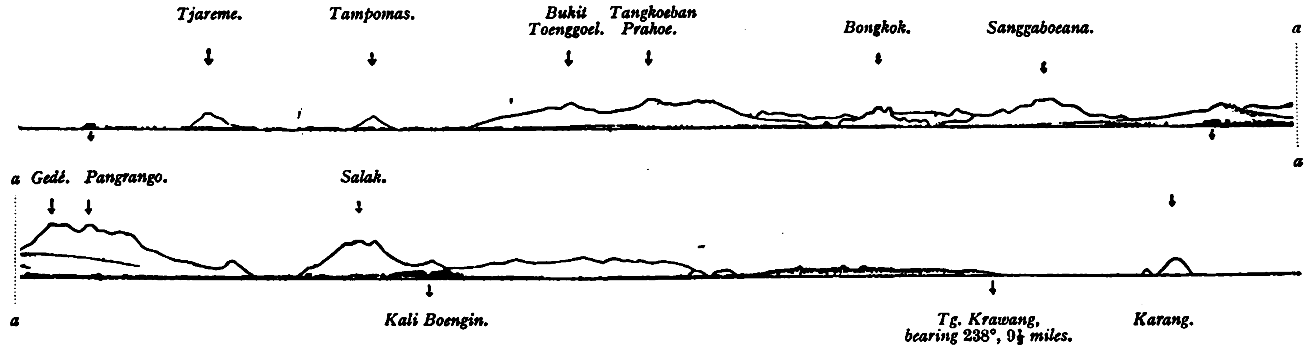
Several rivers flow out on this portion of the coast, but they are of little importance to shipping, as the largest are only navigable for any distance by praus.

Of the anchorages Reede Cheribon affords a good, safe roadstead against high seas in the west monsoon; at Reede Japara (page 99), vessels can find good anchorage in the east monsoon, but it is unsafe during the west monsoon. Reede Tegal (page 94) and Reede Pekalongan (page 95) are entirely open, and Semarang, although affording good holding ground, is too much exposed to northerly and westerly winds to be considered very safe during the west monsoon.

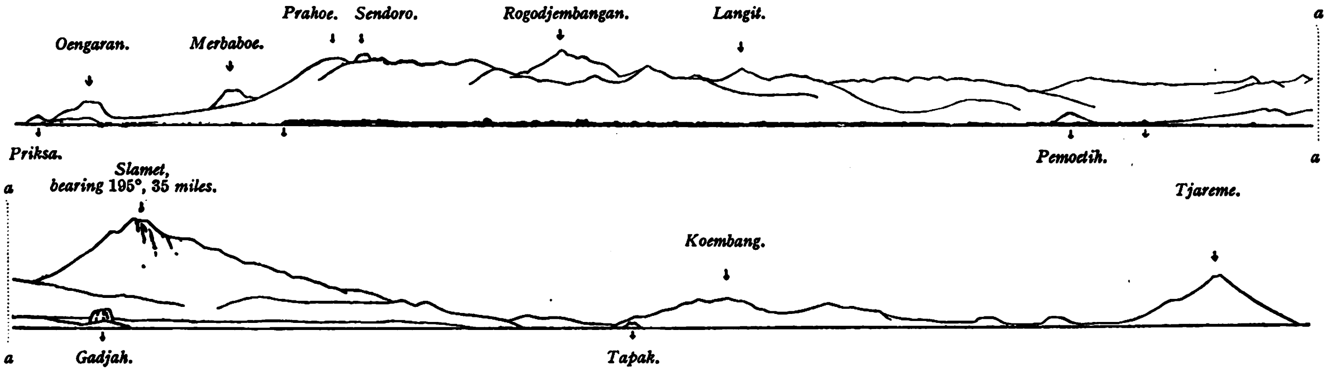
Except in the vicinity of Tanjong Tanah (*Lat.* 6° 29′ S.,

Charts 1066, 941a, 1263.

To face page 91.



View, in two parts, of north coast of Java between Tanjong Krawang and Tanjong Indramajoe.
(*Original dated* 1931.)



View, in two parts, of north coast of Java between Cheribon and Semarang.
(*Original dated* 1931.)

Chart 1653b.

Long. 108° 33′ E.) the coast can be approached safely everywhere. The detached dangers to avoid are Karang Jeruk (page 95), Pemalang and Sugali rocks (page 95), Karang Bapang (page 96), Korowelang rif (page 96), Karang Ombo (page 99), and Sverre reef (page 104), southward of the Karimoen Djawa (Karimun Jawa) eilanden.

Mountains.—Southward of Cheribon a long ridge of mountains runs nearly parallel with the coast, at a distance of 20 miles from it, from the southern slopes of Tjareme (page 87), and terminates about 30 miles south-eastward in a prominent round summit named Koembang (Kumbang), 3,997 feet (1,218^{m}3) high. Between this range and the sea is an isolated hill, 602 feet (183^{m}5) high, named Toekoeng (Tukung), situated about 8 miles northward of Koembang; Tapak, 1,114 feet (339^{m}6) high, lies 6¼ miles eastward of Koembang, and Sirantjoeang (Siranchang), 477 feet (145^{m}4) high, is about 5 miles north-eastward of Tapak.

Slamet or Piek van Tegal, about 18 miles east-south-eastward of Tapak, is a truncated cone-shaped volcano; when seen from a north-westerly and northerly direction it shows a nearly flat top, with a higher part on the north-eastern side, which is the edge of the old crater; the new crater, from which a thick column of smoke frequently issues, is situated on the south-western side of the mountain. Northward of Slamet, and about 8 miles inland, is Gadjah (Gajah), an almost bare rock, 1,015 feet (309^{m}4) high, standing in the midst of a thickly wooded hilly district, and resembling a gigantic elephant with its head north-north-westward; eastward of Gadjah, on the same ridge and of about the same elevation, are two wooded hills resembling coffins. *See* view facing this page.

Prahoe (Prahu), about 43 miles eastward of Slamet, is 8,456 feet (2,577^{m}4) high, and the eastern and highest peak of a long ridge, and resembles a vessel, bottom up, lying in a north-westerly and south-easterly direction. With the exception of Langit and Ragadjembangan (Ragajembangan), 23½ and 31 miles eastward, respectively, of Slamet, the other peaks lying westward of Prahoe are difficult to identify. Langit appears as a sharp peak, 5,323 feet (1,622^{m}4) high, when seen from north-westward, and Ragadjembangan as a truncated cone, 7,141 feet (2,176^{m}6) high, whilst both assume a more rounded shape and become less prominent on proceeding eastward. Sendoro and Soembing (Sumbing) lie about 7½ and 14 miles, respectively, south-south-eastward of Prahoe; the former is 10,336 feet (3,150^{m}4) high, and has a truncated cone; the latter is 11,057 feet (3,370^{m}2) high, and has a rugged summit, with its prominent higher part on the western side.

Northward of Prahoe a hilly ridge runs parallel with and close to the coast; the most noticeable summit of this ridge is Priksa, a round, wooded mountain, 1,202 feet (366^{m}4) high. About 29 miles south-eastward of Priksa is Oengaran (Ungaran), with a round, undulating summit, 6,724 feet (2,049^{m}5) high, and connected by a ridge, running in a southerly direction for about 17 miles, to Merbaboe (Merbabu); the latter is a volcano, 10,315 feet (3,144^{m}0) high, which has been quiescent for centuries, and has a horseshoe-shaped crater with the opening to the north-west. Merapi (*Lat. 7° 32′ S., Long. 110° 27′ E.*), lying about 5½ miles southward of Merbaboe, is 9,548 feet (2,910^{m}2) high, and sometimes visible in the background. Lawoe (Lawu) is a volcano, 10,722 feet (3,268^{m}1) high, about 45 miles

Charts 1066, 941a, 1263.

Chart 1653b.

eastward of Merapi, and, although many miles inland, is often visible. *See* view facing page 100.

Southward of Mandalika (page 100), is the Moerja gebergte (Murya range), an extinct volcano, of which the highest peak is Soetorenggo, (Sutorenggo), 5,260 feet (1,603^{m}3) high, which appears sharp when seen from north-eastward, but like a truncated cone from north-westward. On the south-eastern slope of the Moerja gebergte, and about 7 miles from the summit, is a hill, 664 feet (202^{m}4) high, with a prominent tree on top.

Coast.—Dangers.—Light-buoy.—The coast southward of Tanjong Tanah is fringed by Rif van Tanah; an extensive bank, with depths of less than 3 fathoms (5^{m}5) over it, composed of sand and mud, here and there mixed with broken shells, extends about 10 miles east-south-eastward from Tanjong Tanah; it is steep-to on its northern side, where the depths increase rapidly to 5 fathoms (9^{m}1). A gradually deepening flat, named Rif van Cheribon, extends south-eastward from the 3-fathom (5^{m}5) line of the above bank, and is connected with the western extremity of the Losari delta. In the northern part the bottom is mostly hard sand and mud, and farther southward, soft mud.

The eastern extremity of Rif van Tanah is marked by a light-buoy, painted white, exhibiting a *white flashing* light, giving one flash of *four seconds* duration every *sixteen seconds,* moored about 11½ miles east-south-eastward of the point.

Chart 932, plan of Cheribon road.

Reede Cheribon.—Lights.—Danger.—Reede Cheribon, in the bight between Tanjong Tanah and Tanjong Losari, 27 miles south-eastward, affords good anchorage in the west monsoon; the usual anchorage is about 2½ miles off Cheribon town, in a depth of about 4½ fathoms (8^{m}2), soft mud. The following are prominent marks when approaching the anchorage: Djati (Jati), a hill, near the mouth of Sungei Pekik, about 11 miles southward of Tanjong Tanah, a round, wooded hill, 197 feet (60^{m}0) high, rising from the otherwise low, monotonous coast; the steeple of the Roman Catholic church and the Javanese bank, close southward of Cheribon harbour; the chimney of the electric power station about 7 cables north-westward of the main harbour light.

A shoal, with a depth of 2 fathoms (3^{m}7) over it, lies 2 miles east-north-eastward of the light-structure (*Lat. 6° 43′ S., Long. 108° 34′ E.*), at the root of the eastern pier.

The roadstead is bounded by the parallel of 6° 40′ S., and the meridian of 108° 40′ E.

Cheribon harbour, comprising two triangular-shaped basins, only available for small vessels, is entered between two moles extending in a north-easterly direction from the coast. The northern basin is known as "Tweede haven," and the southern basin as "Eerste haven"; from the south-eastern corner of the latter a narrow harbour, known as "Haven kanaal", runs in a south-westerly direction. Between Eerste haven and Haven kanaal, and parallel with the latter, is the so-called "Boom haven." The harbour is connected to the railway system. There are some patent slips for dredgers and praus at the western end of the latter. In 1948, the least depth in the entrance was 5 feet (1^{m}5), and the depth alongside the mole on the eastern side of

Charts 1066, 941a, 1263.

Chart 932, plan of Cheribon road.

the inner part of Eerste haven was 6 feet ($1^{m}8$). In Tweede haven there was a depth of 7½ feet ($2^{m}3$). Inside the harbour entrance there is a narrow channel, with a depth of 6 fathoms ($11^{m}0$).

A light is exhibited, at an elevation of 34 feet ($10^{m}4$), from a white beacon, 29 feet ($8^{m}8$) in height, situated about 3 cables north-westward of the mouth of Sungei Pekik.

A light is exhibited, at an elevation of 50 feet ($15^{m}4$), from a white iron framework structure, with black bands, 46 feet ($14^{m}0$) in height, at the root of the eastern mole.

A light is exhibited from a white iron framework structure at the head and at the elbow of each pier. The Custom house is situated near the junction of the Haven kanaal with Eerste haven; the duties of harbour master are carried out by the Customs officer.

Town.—The town of Cheribon extends along the coast, and is the headquarters of a Government official; the Residency is at the northern end of the town. The town is very unhealthy. Provisions are plentiful; good water may be obtained from an aqueduct in the Haven kanaal in the wet season, but it is scarce in the dry season. Coal can only be obtained in small quantities. The town is connected by railway, telegraph, and telephone with all the principal places in Java. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and also by European steamship lines. In 1947 the population of Cheribon was about 32,600.

The principal exports are sugar, tapioca, pinang, rice, groundnut oil and spirits; the chief imports are phosphate, tobacco, dried fish, machinery, textiles, cement, iron and flour.

Weather.—During the east monsoon a very dry wind from southward to south-westward, named locally "angin koembang," usually sets in between 1900 and 2100, and continues strongly till sunrise, when it decreases in force and dies away entirely between 0900 and 1000. Two hours later a north-easterly to northerly wind sets in, usually weak, but occasionally increasing to a stiff breeze in the afternoon; when the latter is the case it usually shifts to about east. There is often a swell from an east-north-easterly or easterly direction in Reede Cheribon, usually increasing towards the evening and diminishing again in the morning.

During the west monsoon thick white clouds gather in the forenoon on the slopes of Tjareme and Slamet; in the afternoon these clouds pack together in a heavy, dark sky, and about sunset discharge heavy rain, with squalls from the west and south-west. Sometimes the weather then remains squally throughout the night; at other times, after a heavy shower, it is calm for a considerable time, with a light breeze from south-west to west. In the latter part of the night the wind then blows hard again from north-west, generally shifting towards morning to west-north-west, increasing in force in the forenoon or afternoon and shifting again to north-west. These strong north-westerly winds continue for days together in February, and are mostly coupled with dry weather, but occasionally with showers.

Charts 932, plan of Cheribon road, 1653a, b.

Directions.—Vessels making for Reede Cheribon from westward should keep in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$) until Kromong (page 87), is in line with Djati (*Lat. 6° 41′ S., Long. 108° 32′ E.*), bearing 249°, when they may safely cross Rif van

Charts 1066, 941a, 1263.

Charts 932, plan of Cheribon road, 1653a, b.

Cheribon, in a least depth of 18 feet (5^m5), southward of this line.

Vessels of deeper draught use the channel southward of Rif van Cheribon, where there is a least depth of 4½ fathoms (8^m2), passing about 2 miles northward of Tanjong Sanggaroeng; when about 5 miles westward of that point the depths will increase to 5 or 6 fathoms (9^m1 or 11^m0) off the town. From eastward, Ujong Brebes (*see* below) should not be approached in a depth of less than 7 fathoms (12^m8).

Chart 1653b.

Coast.—Mooring buoy.—Tanjong Bangkaderes, about 6½ miles south-eastward of Cheribon harbour, and Tanjong Sanggaroeng (Sanggarung), about 8½ miles farther eastward, are low wooded points formed by the alluvium of small rivers. Gebang village, midway between these two points, stands hidden in the midst of coconut trees; 2 miles east-south-eastward of this village, and about one mile inland, there is a very prominent sugar factory with two white chimneys. About 3 miles eastward of this factory, and nearly 2 miles inland, is Losari sugar factory, with a blue roof.

A light-buoy, painted black, exhibiting a *white flashing* light of *four seconds* duration *every sixteen seconds*, is moored about 2 miles north-north-eastward of Tanjong Sanggaroeng.

Tanjong Losari, about 4 miles eastward of Tanjong Sanggaroeng, and Ujong Brebes, 8½ miles farther eastward, are also low and wooded, being formed by the deposit of several small rivers; as these points are probably extending northward they should not be approached into a depth of less than 7 fathoms (12^m8). The roofs of the houses of the small fishing village Poelolampes (Pulolampes), at the head of the bight between these two points, are plainly visible.

A shoal, with a depth of 16 feet (4^m9) over it, lies about 4 miles east-south-eastward of Ujong Brebes, and about 1¾ miles offshore.

Chart 3311, plan of Tegal road.

Reede Tegal.—Lights.—Danger.—Buoys.—Reede Tegal, off the town of Tegal, about 9 miles south-eastward of Ujong Brebes, affords anchorage, in depths of from 2¾ to 4 fathoms (5^m0 to 7^m3), at a distance of from one to 2 miles northward of the town; the holding ground is good everywhere.

Two moles extend in a northerly direction from the town, and the narrow harbour between them is named "Oudhaven kanaal"; on the western side of the moles there is a larger, rectangular harbour known as the Binnen haven. Both harbours are only available for small vessels. The duties of Harbour master are carried out by the Customs officer; the Custom house is situated between the two harbours. A blue flag is displayed here when it is dangerous to enter. There are three patent slips for small vessels and praus in the north-western corner of the Binnen haven. The entrance and both harbours are maintained at depths of from 7 to 8 feet (2^m1 to 2^m4) by dredging. In 1948, the least depth in the harbour entrance was 4 feet (1^m2).

A light (*Lat. 6° 51′ S., Long. 109° 08′ E.*) is exhibited, at an elevation of 52 feet (15^m8), from a white iron framework structure, 59 feet (18^m0) in height, with a stone dwelling, at the root of the western mole at Tegal.

A light is exhibited, at an elevation of 11 feet (3^m4), from the head

Charts 1066, 941a, 1263.

Chart 3311, plan of Tegal road.

of each mole, and a light is exhibited from the eastern mole, about 2 cables within its head.

A light is exhibited, at an elevation of 41 feet (13^m5), from the Custom house.

Karang Djeroek (Jeruk) is a steep-to coral reef, on which there is a rock above water, lying about 4¼ miles north-eastward of Tegal light-structure.

A light is exhibited, at an elevation of 34 feet (10^m4), from a black beacon, 26 feet (7^m9) in height, on Karang Djeroek.

A black barrel buoy is moored about 1¾ cables east-north-eastward of the head of the eastern mole, and a white barrel buoy about 2¼ cables west-north-westward of the western mole-head.

There are no noticeable features in Tegal from seaward. The town is connected with the general railway, telegraph and telephone systems of Java. There is regular communication by steamer with other ports in the island. Provisions may be obtained, and drinking water from artesian wells.

Chart 1653b.

Coast.—Lights.—Dangers.—Buoy.—The coast between Tegal and Tanjong Sari, a wooded projection, 14 miles eastward, is well populated, the various hamlets, surrounded by coconut trees, being plainly visible from the offing. The coast thence to Tanjong Pemalang, about 8 miles north-eastward, is uniformly wooded.

A light is exhibited on Tanjong Sari.

Tanjong Pemalang, a low, wooded point, should not be approached within a depth of 11 fathoms (20^m1), as it is extending northward (*see* caution on page 72). Kali Tjomal (Chomal) discharges at this point by a delta mouth. Kali Sragi flows out by two mouths between Tanjong Pemalang and Pekalongan, about 13 miles east-south-eastward; there is a prominent clump of coconut trees close to the beach about 1½ miles east-south-eastward of the mouth of Kali Sragi.

Sugali and Pemalang rocks, with depths of 15 and 18 feet (4^m6 and 5^m5) over them, respectively, lie about 4 miles north-westward of Tanjong Pemalang; they are about one mile apart from each other, and are marked by discoloration. A white conical buoy, surmounted by a ball, marks the northern side of Pemalang rock. Between Tanjong Sari and Tanjong Pemalang vessels should keep outside the 5-fathom (9^m1) line, owing to the existence of posts belonging to old fishing nets.

A light (*Lat. 6° 51′ S., Long. 109° 40′ E.*) is exhibited, at an elevation of 30 feet (9^m1), from a white beacon, 26 feet (7^m9) in height, 11½ miles east-south-eastward of Tanjong Pemalang.

Reede Pekalongan.—Lights.—Reede Pekalongan, bounded by the arc of a circle described from the main light-structure with a radius of 3½ miles, and by the coast, affords anchorage, in depths of from 3 to 4 fathoms (5^m5 to 7^m3), soft mud, about one mile offshore, with Pekalongan main light-structure bearing between 160° and 200°. From eastward, a group of casuarina trees about half a cable southward of the light-structure is easier to distinguish than the light-structure.

The harbour is formed by the mouth of Kali Pekalongan, which enters the sea between two concrete moles. In 1947, the harbour was silted up and encumbered with numerous wrecks, and no vessels could enter.

Charts 1066, 941a, 1263.

Chart 1653b.

A light is exhibited, at an elevation of 44 feet ($13^{m}4$), from a white iron framework structure, 46 feet ($14^{m}0$) in height, situated on the left bank of Kali Pekalongan, just within the entrance.

A light is occasionally exhibited on the head of each mole, and another light at the root of the east mole.

There is a patent slip for small vessels on the west bank, just within the entrance; the Custom house, with landing steps, is situated close southward. There is a quay, on which there are two cranes, the larger having a lifting capacity of 7 tons, at the town of Pekalongan. Fresh provisions can be obtained, but water is scarce.

The town of Pekalongan is situated on both sides of the river, about 1¾ miles from the mouth, and is the headquarters of a Government official. The river is spanned by a bridge, with a fort near it which was built on the beach in 1753, and, owing to constant silting, now lies nearly two miles inland. Pekalongan is connected to the general railway, telegraph, and telephone systems of the island; the roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. A good road leads along the left bank of the river from the light-structure to the town.

Tanjong Goenoeng (Gunung), 6¾ miles east-south-eastward of Pekalongan light-structure, rises to a small hillock wooded with tall trees, the tops of which are at an elevation of 272 feet ($82^{m}9$). The character of the coast changes here, and is hilly until a short distance eastward of Tanjong Tjelong (Chelong), a high, wooded point about 8 miles eastward of Tanjong Goenoeng.

Tanjong Korowelang, about 14 miles eastward of Tanjong Tjelong, is a low point formed by the alluvium from the Kali Bodri, which has a delta mouth; there are a few high trees on the point (*see* caution on page 72). The coast between Tanjong Korowelang and Semarang, about 15 miles east-south-eastward, is marshy for a great part.

Off-lying dangers.—Beacon.—Karang Bapang lies about 19 miles north-north-eastward of Pekalongan light-structure, and it is, therefore, difficult to distinguish the coast when in its vicinity. The least depth on the reef, which is steep-to, is 11 feet ($3^{m}4$), and it is seldom marked by discoloration; a white iron beacon, surmounted by a ball, stands on the middle of the reef, and the beacon should be given a berth of fully 3 cables.

A shoal, with a depth of 11 feet ($3^{m}4$) over it, lies about 2¾ miles south-westward of Karang Bapang.

Korowelang rif, about 2½ miles northward of Tanjong Korowelang (*Lat. 6° 51′ S., Long. 110° 10′ E.*), is steep-to, and has a depth of 13 feet ($4^{m}0$) over it; it is not marked by discoloration. The usual route for vessels lies northward of the rock.

Karang Djahe (Jahe), a coral patch, with a depth of 52 feet ($15^{m}8$) over it, lies one mile west-north-westward of Korowelang rif.

Charts 932, plan of Semarang road, 1653b.

Reede Semarang.—Lights.—Reede Semarang, off the town of Semarang, affords fairly good holding ground, but it is entirely open from north-north-east, through north, to west, and strong winds quickly raise a sea; in the west monsoon it is often necessary to let go a second anchor. Large vessels usually anchor, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), about 3 miles offshore; smaller vessels anchor in depths

Charts 1066, 941a, 1263.

Charts 932, plan of Semarang road, 1653b.

of from 16 to 23 feet ($4^{m}9$ to $7^{m}0$), about one mile from the head of the western mole. The roadstead appears to be silting up.

The following objects may be identified when approaching the roadstead:—The lighthouse; Melaja (Melaya), a hill, 182 feet ($55^{m}5$) high, with two tombs on its summit, about 2¾ miles south-westward of the lighthouse; the railway station, a long white building with a red roof, situated close east-south-eastward of the lighthouse.

Reede Semarang is bounded by the arc of a circle with a radius of 3 miles from the main lighthouse.

Chart 932, plan of Semarang road.

A light is exhibited, at an elevation of 107 feet ($32^{m}6$), from a white iron tower, 98 feet ($29^{m}9$) in height, on the western side of the harbour canal.

A light is exhibited, at an elevation of 31 feet ($9^{m}4$), from a white iron framework structure, 26 feet ($7^{m}9$) in height, on the head of the western mole; another light is occasionally exhibited on the same mole, about 3½ cables southward of the above; a light is also shown on the head of the eastern mole, and also about 3¾ cables southward of its head.

Obstruction.—An obstruction, marked by a green conical buoy, lies one mile north-north-westward of the head of the western mole.

Haven van Semarang.—Kali Baroe, the eastern mouth of the Semarang rivier, is enclosed between two moles, and forms a harbour for small vessels and praus; there is a lock at the junction between Kali Baroe and the main river. The western mole is very low, and the eastern covers at high water. On the eastern side of the canal thus formed is a narrow passage leading into an artificial harbour running in a south-easterly direction, called the outer harbour; the inner end of this harbour is divided into two parts, called the first and second inner harbours, by a long wharf. On the north-eastern side of the outer harbour, and parallel with it, there is another harbour, named the "Oosten haven kanaal." There are quays, with sheds and cranes, along Kali Baroe and the harbours; branch lines connect them with the main railway lines.

In 1947, in the harbour entrance and in Oosten haven kanaal there was a least depth of 8 feet ($2^{m}4$); in the fishing harbour and inner harbours 10 feet ($3^{m}0$).

When communication with the shore is suspended owing to bad weather, a blue flag is displayed on the Harbour office; vessels can then communicate by the International code.

When entering, especially during the west monsoon, it is advisable to hold close to the western mole, as the stream sets across the entrance.

Leading lights, situated close southward of the main lighthouse, in line, bearing 181°, lead between the entrance moles.

Town.—The town of Semarang (*Lat. 6° 58′ S., Long. 110° 25′ E.*) stands on both sides of the unimportant Semarang rivier, and is the headquarters of a Government official. The place is unhealthy, and the houses in the old town are now more used for offices and warehouses than for actual dwellings; many of the Europeans live at Tjandi, an upper town built on a hilly ridge, about 330 feet ($100^{m}6$) high, near Semarang.

Harbour facilities.—Coal is only obtainable in small quantities; the loading is carried out by praus, and is impracticable in the west monsoon.

Charts 1066, 941a, 1263.

Chart 932, plan of Semarang road.

Provisions are plentiful. Excellent water can be obtained in the roadstead from water lighters.

There are two small docks for light craft entered from the outer harbour. Minor repairs to engines can be executed. The largest crane has a lifting capacity of 20 tons. Several small tugs are available for towing lighters, and a few of these can tow vessels for short distances; some of the tugs are fitted with steam pumps, either for extinguishing fires or assisting leaking vessels. There is also a floating fire engine.

Vessels arriving with infectious cases must display the quarantine flag and await the arrival of the doctor; they may only communicate with the shore after obtaining his permission. European infectious cases are taken to the Military hospital; there are quarters on the Oosten haven kanaal for Chinese and natives.

There are three hospitals, of which the Juliana Sickenhaus is the best for Europeans.

There is regular communication by steamer with other ports in Java. Semarang is connected to the general railway, telegraph and telephone systems of the island.

Weather.—During the west monsoon, in Reede Semarang, it either blows hard, accompanied by rain, or else it is almost completely calm; there is no between phase. The finest weather is often replaced, without any warning, by bad, squally weather. The monsoon wind is never southward of west-south-west; the main direction of the sea wind during this monsoon is north-west, and the land wind is reduced in strength.

During the east monsoon, the land wind usually blows regularly, from an east-south-east to south-east direction, throughout the night up to about 0900; thence the force diminishes and shifts in the same direction as the sun till 1200 to about north-north-east. Until 1400 there are light, variable winds, and then the sea breeze arrives suddenly from a north by east direction, quickly raising a swell and sea, and blowing with great regularity until 1900 to 2000. The wind then shifts back to east-south-east, being less regular for a short period, and becoming steady again after 2100. Around sunrise the atmosphere is very hazy, but after a couple of hours' sunshine it becomes clearer, although the land in the interior often remains obscured; towards afternoon it becomes hazy again. During this monsoon, not more than about 2 hours a day of even moderate visibility can be expected.

Chart 1653b.

Coast.— Between Semarang and Japara (*Lat.* 6° 35′ *S., Long.* 110° 39′ *E.*), 26 miles north-north-eastward, the coast is swampy and is low far inland; a number of small rivers discharge, but they are scarcely navigable for praus. There are no dangers, except Visschers eiland, off this part of the coast, and it can be safely approached by sounding.

Chart 932, plan of Japara road.

Tanjong Telok Aoer (Aur), 24 miles north-north-eastward of Semarang lighthouse, is a prominent headland, wooded with coconut trees, and fringed by a reef which extends from one to 4 cables offshore; on the north-western side of the reef there are some rocks above water, and on the southern side of the headland there is a white sandy beach.

Charts 1066, 941a, 1263.

Chart 932, plan of Japara road.

Southward of the point the coast is swampy and covered with low shrubs; northward there is a bight with a white sandy beach, and villages can be seen between the coconut trees.

Visschers eiland, about 2¼ miles west-south-westward of Tanjong Telok Aoer, has subsided or been washed away, and now merely consists of a few rocks, about 5 feet ($1^{m}5$) high, surrounded by a reef.

Reede Japara.—Light.—Pandjang (Panjang), an island, 2½ miles northward of Tanjong Telok Aoer, is low, covered with coconut trees, and, except on the south-eastern side, is fringed by a reef, on which numerous rocks are visible at half-tide; it can usually be sighted from a distance of about 10 miles, when it appears as a long, low strip of land, easily distinguished from the land behind on account of its dark colour. Near the south-eastern point there is a white sandy beach, where landing can be effected. Tanjong Kelor, about 2 miles northward of Tanjong Telok Aoer, was formerly an island, but is now joined to the mainland; on its south-western side there is a village and some limekilns. Tanjong Koeniran (Kuniran), 1½ miles northward of Kelor, is low and covered with brushwood; some high coconut trees stand about half a mile within the point, and care should be taken not to mistake the outer edge of these for the extremity of the point.

Reede Japara is bounded by a line drawn from Tanjong Koeniran to the south-eastern extremity of Pandjang, and thence to the northern extremity of Kelor.

A light (*Lat. 6° 35′ S., Long. 110° 39′ E.*) is exhibited, at an elevation of 24 feet ($7^{m}3$), from a post on the southern side of the entrance to Japara rivier.

In the east monsoon there is good anchorage, in depths of from 3¼ to 4¼ fathoms ($5^{m}9$ to $7^{m}8$), soft mud, with Tanjong Telok Aoer in line with the western extremity of Kelor, bearing about 190°; vessels should not anchor too close to Kelor, as a reef extends about 3 cables from its northern side. The main approach to the anchorage is between Pandjang and Tanjong Koeniran, but vessels from southward can safely pass between Pandjang and Kelor; Tanjong Koeniran, bearing 018°, leads through in a least depth of about 4¼ fathoms ($7^{m}8$).

The town of Japara is situated in the south-eastern part of the bay, about half a mile up Japara rivier; very little of the town is visible from the roadstead, but a fishing village at the mouth of the river, with the harbour office near it, are readily distinguished. Only small praus can pass in or out of the river. The roadstead is seldom visited, as it has no trade by sea. The town is connected with the general telegraph system.

Coast.—Between Tanjong Koeniran and Tanjong Piring, about 3 miles north-north-eastward, the coast is indented by three bays with low rocky points and white sandy beaches between them. Tanjong Toempoek (Tumpuk) and Tanjong Sependok, separating these bays, are low and fringed with reefs. Tanjong Piring is a low, flat, prominent point covered with low shrubs, and bordered with a white sandy beach. There is a large wood about 2 cables within the point, but it is only noticeable from northward and southward.

Chart 1653b.

Off-lying danger.—Karang Ombo, with a depth of 26 feet ($7^{m}9$)

Charts 1066, 941a, 1263.

Chart 1653b.

over it, lies about 1¾ miles northward of Tanjong Piring, and about 1½ miles offshore ; it is the only off-lying danger along this part of the coast outside the 6-fathom (11^{m}0) line.

Coast.—Tanjong Djati (Jati), 5 miles north-eastward of Tanjong Piring, is wooded with high trees to the water's edge ; it can only be distinguished when seen clear of the land behind. Tanjong Tanah Merah, 4¾ miles east-north-eastward of Tanjong Djati, is a reddish point ; its appearance is that of a prominent steep rock, the crest being thickly wooded with dark trees. Tanjong Toewesi (Tuwesi), about 2½ miles east-north-eastward of Tanah Merah, rises abruptly from the sea and is thickly wooded ; a sunken rock lies about three-quarters of a mile offshore about 2 miles westward of Tanjong Toewesi, and there are rocks a quarter of a cable off the same point. Tanjong Toelar, 4 miles eastward of Tanjong Toewesi, is difficult to identify ; some isolated rocks, almost awash, lie just within the 3-fathom (5^{m}5) line off this point, and close westward of them is a rock which dries. Tanjong Beteng, about one mile eastward of Tanjong Toelar, has a round hill on it, named Blinderan, 165 feet (50^{m}3) high, and Goea Manik, a hill, 211 feet (64^{m}3) high, lies about half a mile westward ; both these hills are noticeable from westward.

Tjelering (Chelering) gebergte, southward of Tanjong Beteng, is rugged, its highest peak being Genoek (Genuk), with an elevation of 2,350 feet (716^{m}2), lying about 2½ miles from the point. About 3 miles east-south-eastward of Tanjong Beteng and near the coast is Bako, a hill, 579 feet (176^{m}5) high, with Ragas, 451 feet (137^{m}5) high, close southward of it, and Beloemboeng, 693 feet (211^{m}2) high, about 1½ miles farther southward.

Off-lying island.—**Light.**—Mandalika, about 1¼ miles northward of Tanjong Beteng, is a rocky, wooded island rising steeply from the sea to an elevation of 243 feet (74^{m}1) ; on the south-western point of the island is a mole on which there is a landing place for boats, and there is a white sandy beach eastward of it. *See* view facing this page.

The channel between Mandalika and the coast is clear of dangers ; the usual track is northward of the island. Small vessels using the channel southward of it should steer a mid-channel course, giving the south-eastern side of the island a berth to avoid a shoal extending fully 3 cables from it.

A light is exhibited, at an elevation of 280 feet (85^{m}3), from a white iron framework structure, 52 feet (15^{m}8) in height, and a white dwelling, on the summit of Mandalika (*Lat. 6° 23′ S., Long. 110° 55′ E.*).

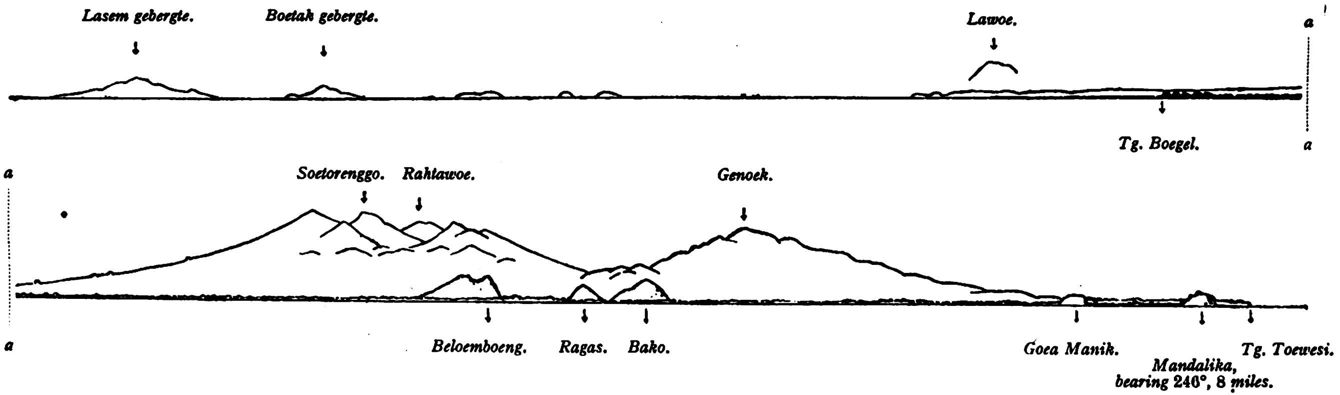
Coast.—Tanjong Api Api Anom, about 7½ miles eastward of Tanjong Beteng, is low and covered with vegetation ; although the coast here turns sharply southward to the equally low Tanjong Boegel (Bugel), this is not noticeable from any distance. *See* caution on page 72.

Bank van Boegel or Tajoe (Bugel or Tayu bank), an extensive mud-bank, with depths of less than 3 fathoms (5^{m}5) over it, extends from 4 to 5 miles offshore from northward of Tanjong Api Api Anom to a point about 20 miles south-eastward ; it is steep-to on the northern side, but can be approached by sounding on its eastern side.

KARIMOEN DJAWA EILANDEN.—This group of islands lies about 37 miles north-westward of Mandalika, and consists of 25 islands

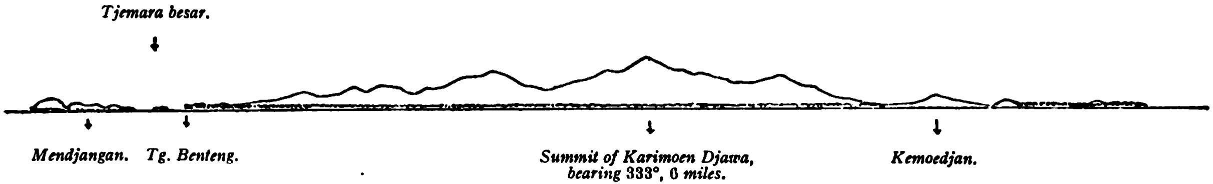
Charts 1066, 941a, 1263.

To face page 100.



View, in two parts, of north coast of Java. Mandalika and coast eastward.

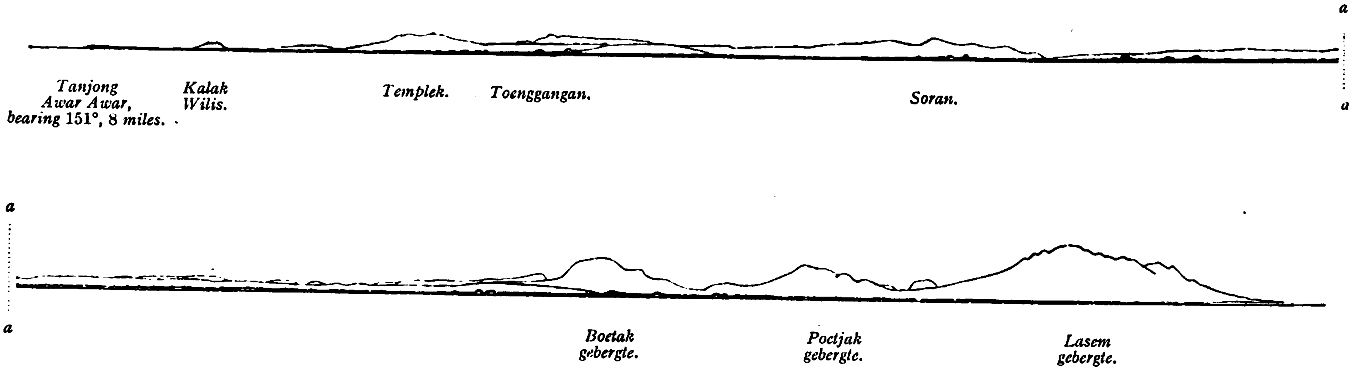
(*Original dated* 1931.)


Tjemara besar.
Mendjangan.
Tg. Benteng.
Summit of Karimoen Djawa,
bearing 333°, 6 miles.
Kemoedjan.

Karimoen Djawa eilanden.

(*Original dated* 1931.)

To face page 101.



View, in two parts, of north coast of Java between Tanjong Bendoh and Tanjong Awar Awar.

(*Original dated* 1947.)

Chart 1653b.

and islets, with numerous reefs. Karimoen Djawa (Karimun Jawa), Kemoedjan (Kemujan) and Genting, at the eastern end of the group, are moderately high and are probably of volcanic origin ; the remaining islands and islets are more or less flat and of coral formation. All the islands are thickly wooded, the lower ones mostly with coconut trees and shrubs, and the higher with tall trees. *See* view facing page 100.

The majority of the inhabitants of these islands live in the southern part of Karimoen Djawa. A brisk native trade is carried on with Semarang, Japara, and Djoeana (Juana), and also with Bali, Timor, and islands eastward ; when navigating in these waters, therefore, a good look-out should be kept for sailing praus, especially at night. During the transition periods of the monsoons there is considerable traffic from and to Java.

Currents.—Around Karimoen Djawa eilanden the east-going current in January and February is stronger on the average than the west-going current in July and August.

Karimoen Djawa.—Karimoen Djawa, the largest island of the group, can be identified from a considerable distance owing to its mountainous character. Pasarehan (*Lat. 5° 51′ S., Long. 110° 27′ E.*), its highest peak, rises to an elevation of 1,659 feet ($505^{m}7$), and spurs branch off to the various points of the island, which are composed mostly of large boulders ; there are sandy beaches between the points, and occasional mountain streams. The island is fringed by a stone and coral reef with several detached coral patches outside it, especially on the northern and western sides. Batoe, a bare rock joined to Karimoen Djawa by a reef, lies in the middle of a bay on the south-eastern side.

Chart 3311, plan of Krimon Java road.

Reede Karimoen Djawa. — Light. — Reede Karimoen Djawa (Krimon Java), off the south-western side of Karimoen Djawa, affords anchorage either north-westward or south-eastward of Tanjong Benteng, the low south-western point of the island, according to the monsoon. Karimoen Djawa (Krimon Java) village, consisting of a few houses, is situated near the above point ; there are no Europeans here, and the Netherlands administration is carried out by a native chief. There is a small pier for boats on the western side of Tanjong Benteng, which is approached by a channel in the coastal reef, marked by stakes.

A light is exhibited, at an elevation of 11 feet ($3^{m}4$), from a wooden post, on Tanjong Benteng.

Tanjong Poedak (Pudak), the southern extremity of Karimoen Djawa, slopes gradually, and has a conspicuous round-topped tree about 2¾ cables within its extremity, which is a good mark for making the roadstead.

The roadstead is bounded by lines drawn from the north-western and southern extremities of Mendjangan (Menjangan) besar to Tanjong Gelam, the western extremity of Karimoen Djawa, and Tanjong Poedak, and by the coast between them.

Mendjangan besar and Mendjangan (Menjangan) kechil, lying within 1¾ miles south-westward of Tanjong Benteng, are low islets covered with coconut trees ; there are numerous rocks, which dry, on the extensive reefs surrounding them. Between the reef surrounding Mendjangan besar and that fringing the main island

Charts 1066, 941a, 1263.

Chart 3311, plan of Krimon Java road.

there is a narrow channel, with depths of from 4 to 10 fathoms (7^{m}3 to 18^{m}3), sand, in which there is often a strong current and sometimes whirlpools; there are some small reefs in this channel and it is marked with stakes by the natives for the use of praus. There is also a deep channel, with some reefs in the northern part, between the reefs extending from the two Mendjangan eilandjes. These channels should not be used by vessels without local knowledge.

Anchorages.—Directions.—In the east monsoon there is good anchorage northward of Mendjangan eilandjes. To make this anchorage from southward a vessel should pass at least 5 cables westward of Mendjangan kechil until the conspicuous tree within Tanjong Poedak bears 114°, when she should steer for it on that bearing, which will lead about 2 cables north-eastward of Karang Wangkang, a reef about 6 cables northward of Mendjangan kechil. When Tanjong Gelam is in line with the eastern extremity of Bengkoang (chart 1653b), bearing 002°, the vessel can anchor, in depths of from 14 to 15 fathoms (25^{m}6 to 27^{m}4), sand. There is also anchorage farther south-eastward with Tanjong Benteng bearing 140°, in depths of from 12 to 13 fathoms (21^{m}9 to 23^{m}8), sand; vessels making for this anchorage, however, should obtain the assistance of a native pilot, as there are some small coral patches, not usually marked by discoloration, in the approach to this anchorage.

Charts 3311, plan of Krimon Java road, 1653b.

In the west monsoon there is fairly good anchorage in the southern part of the channel between Mendjangan besar (*Lat. 5° 53′ S., Long. 110° 26′ E.*) and Karimoen Djawa, in depths of from 15 to 17 fathoms (27^{m}4 to 31^{m}1), sand, south-eastward of the flagstaff in Karimoen Djawa village. To make this anchorage, the vessel should bring Tjemara (Chemara) kechil in line with Tanjong Benteng, bearing about 313°, and steer on this alignment until Genting disappears behind Tanjong Poedak; the bottom at this anchorage is, however, uneven, and frequent whirlpools make the vessel swing violently. Vessels lie better close under the coast of Karimoen Djawa, in depths of from 11 to 12 fathoms (20^{m}1 to 21^{m}9), but it is necessary to be able to see the edge of the reefs or the assistance of a native fisherman obtained.

Chart 1653b.

Kemoedjan.—Kemoedjan (Kemujan), close northward of Karimoen Djawa, is separated from that island by a narrow passage with a depth of barely one foot (0^{m}3); it is flat and wooded, with only one hill, 373 feet (113^{m}7) high, near the southern extremity. The northern extremity of the island, named Batoe Lawang, and a few headlands on the east and west coasts, are from 80 to 100 feet (24^{m}4 to 30^{m}5) high, and are rocky. On the south-west coast are three deeply penetrating, shallow inlets, and the rocky islet Meritjan lies close offshore about the middle of the west coast.

Islands and dangers westward of Karimoen Djawa.—Gelean and Boeroeng (Burung) lie about 5½ and 6½ miles, respectively, westward of Tanjong Poedak; the former is covered with coconut trees, and the latter with tall trees.

Tjemara (Chemara) kechil, Tjemara (Chemara) besar, and Menjawakan (Menyawakan) are low islets lying from about 3 to 4½ miles northward of Gelean; they are fringed by reefs, that of Tjemara

Charts 1066, 941a, 1263.

Chart 1653b.

besar extending one mile north-eastward; a detached shoal, with a depth of 1¾ fathoms (3^{m}2) over it, lies about half a mile eastward of that islet. Gosong Tjemara (Chemara), about 6 cables north-eastward of Tjemara kechil, has a small patch of sand, which dries, on its northern part. Taka Menjawakan (Menyawakan), 2 miles north-westward of Menjawakan, is a small reef, with a depth of 5 feet (1^{m}5) over it, and the discoloration of the water is only noticeable from a short distance.

Bengkoang, about 4½ miles west-north-westward of the northern extremity of Kemoedjan, is low, wooded, and fringed by a steep-to reef, which extends about 5 cables offshore.

Parang, about 9 miles westward of Bengkoang, is 261 feet (79^{m}6) high in the northern part, where it is rocky; the southern part is low, and has a small village on it. The small islet Koembang (Kumbang) lies on the reef which extends about 1¼ miles south-westward from the southern extremity of Parang. Some detached reefs, with depths of from 1¾ to 3¾ fathoms (3^{m}2 to 6^{m}9) over them, lie within about 8 cables southward of the same extremity. Gosong Koembang (Kumbang), about 2¾ miles south-eastward of Koembang, is a small sandbank above water, surrounded by a steep-to coral reef on which are some rocks, which dry.

Kembar (*Lat.* 5° 46′ *S.*, *Long.* 110° 11′ *E.*), the north-western island of the group, lies about 2½ miles westward of the western extremity of Parang and is covered with bushes; the encircling reef extends nearly 1¼ miles northward from the northern extremity of the island, and has a sandbank above water near its extremity. Gosong Selikoer (Selikur), about one mile north-eastward of Kembar, is a sandbank above water on a coral reef.

Njamoek (Nyamuk), about 4 miles southward of Kembar, is surrounded by a reef; it is rocky on its western side and densely wooded with high trees; on the southern side the trees are lower. Karang Katang and Karang Besi are sand cays lying on the south-eastern and northern parts, respectively, of an extensive reef, which lies about 2 miles west-north-westward of Njamoek. Katang, about 1¼ miles north-westward of Njamoek, is an islet covered with vegetation.

Krakal besar and Krakal kechil lie about 3¼ miles south-eastward of Njamoek; the former has low trees on it, and the latter high trees. Karang Kapal, an extensive coral reef, about 1¾ miles southward of Krakal kechil, partly dries.

Islands and dangers eastward of Karimoen Djawa and Kemoedjan.—Sintok, Tengah, and Ketjil, off the east coast of Kemoedjan, are low and covered with coconut and casuarina trees; the passage between these islets and Kemoedjan is closed on the southern side by a number of coral patches. Gosong Tengah, between Tengah and Sintok, partly dries and has a rock in the northern part always above water. Gosong Batoe Poetih, about one mile south-westward of Sintok, is usually marked by discoloration. Gosong Selaka, about 6 cables east-south-eastward of Tanjong Selaka, the eastern extremity of Karimoen Djawa, is a sandbank just above water and is visible 2 miles.

Tjendikian (Chendikian), about 4 miles eastward of Tanjong Kemoedjan, is low and wooded with low trees; the surrounding coral reef extends half a mile from its north-eastern extremity. Goendoel

Charts 1066, 941a, 1263.

Chart 1653b.

(Gundul), one mile north-eastward of Tjendikian, is a mass of rock, 146 feet (44m5) high, almost bare, being but scantily covered with low brushwood; the fringing reef extends about a quarter of a cable offshore, and is very steep-to.

Genting, Seroeni (Seruni), and Sambangan are the easternmost islands of the group. There are several hills on the eastern side of Genting, the highest having an elevation of 327 feet (99m7); the island is entirely covered with tall trees, and is fringed by a reef which is connected to the reef around Sambangan. A rock, with a depth of 5 feet (1m5) over it, was reported, in, 1948, to lie about three-quarters of a mile eastward of the southern extremity of Genting. Sambangan and Seroeni are low islets covered with coconut trees, with foul ground between them.

Off-lying danger.—Sverre reef, with a least depth of 16 feet (4m9) over it, lies about 10½ miles south-westward of the southern extremity of Karimoen Djawa, and is near the track of vessels proceeding from Tandjoeng Priok haven to Surabaya; the south-western part of the reef consists of three masses of rock, and it is generally plainly marked by discoloration.

TANJONG API API ANOM TO UJONG PANGKA.—Coast.—The western portion of this coast is fairly regular, the most prominent points being Tanjong Bendoh, about 29 miles south-eastward of Tanjong Api Api Anom, Tanjong Petokol, about 19 miles farther south-eastward, and Tanjong Awar Awar, about 11 miles eastward of Tanjong Petokol (*Lat. 6° 46′ S., Long. 111° 46′ E.*). The coast everywhere has a fertile and thickly wooded appearance, and is mostly bordered by a sandy beach.

There are no known dangers outside the 5-fathom (9m1) line, and the coast can be easily approached by sounding; the holding ground is good everywhere. Near the coast the bottom consists of soft grey mud, and farther out of blue mud and black sand, frequently mixed with broken shells; underneath is thick clay. Vessels proceeding from Tandjoeng Priok haven to Surabaya usually pass from 8 to 10 miles northward of Mandalika to a position about 10 miles northward of Ujong Pangka (page 108).

Aspect.—Near Tanjong Bendoh is the Lasem gebergte with two prominent peaks, 2,645 feet (806m2) high, connected to Poetjak (Puchak) and Boetak (Butak) gebergte, farther southward, by a lower ridge. About 8 and 13½ miles westward of Poetjak gebergte are two small hills, the western of which has a high tree on its summit. From Boetak gebergte a uniform ridge of hills trends westward, above which Nlangoe (Nlangu), 1,480 feet (451m1) high, rises about 29 miles south-westward of Tanjong Bendoh. *See* view facing page 101.

Soran, 933 feet (284m4) high, about 16 miles eastward of Boetak gebergte, and the peaks of the Toeban (Tuban) gebergte, from about 12 to 17 miles south-eastward of Soran, can be plainly distinguished. The eastern peak is 916 feet (279m2) high and conical, while the western peak attains an elevation of 1,608 feet (490m1). Kalak Wilis, a hill, 237 feet (72m2) high, 4¼ miles southward of Tanjong Awar Awar, with a small wood on it, is very prominent.

Kebondo, a hill, about 15 miles south-eastward of Tanjong Awar Awar, and about 2 miles inland, and Ngimbang, 552 feet (168m2)

Charts 1066, 941a, 1263.

Chart 1653b.

high, about 2 miles southward of Kebondo, bear some resemblance to the Doodkisten (*see* below), and are sometimes known as the Valsche Doodkisten. Patjakaran (Pachakaran) hill, 247 feet (75^{m}3) high, lies close to the coast about 5 miles north-eastward of Ngimbang, and has a prominent wood on its northern side. Mendjoeloek (Menjuluk), 365 feet (111^{m}2) high, lies 4 miles eastward of Patjakaran, and is a very prominent conical hill. Kandang, Kendil, and Soekowati (Sukowati) lie close to the coast eastward of Mendjoeloek, and are much the same in appearance, being steep on the south and southwestern sides and sloping gradually on the northern sides. Eastward of these three hills, with one exception, all the coastal hills, rising to a maximum elevation of 414 feet (126^{m}2), have the form of coffins. Poendoet (Pundut), about 8 miles west-south-westward of Ujong Pangka, has a small conical peak showing just above the mountain ridge. Doodkisten, about 6 miles south-westward of Ujong Pangka, are bare and flat, and there is a triangulation pyramid, visible 12 miles, on the higher of the two. *See* View A on chart 934.

Charts 934, plan of Juana and Rembang roads, 1653b.

Roadstead limits.—Reeden Djoeana (Juana), Mergatoehoe and Rembang are contiguous; Reeden Djoeana and Mergatoehoe lie in the area between the meridian of the eastern extremity of Pulau Gedeh, situated about 12 miles west-south-westward of Tanjong Bendoh, and a line drawn in a 330° direction from the same extremity, to meet a line drawn in an 056° direction from the mouth of the Sungei Tajoe (Tayu), situated about 15 miles west-north-westward of Pulau Gedeh.

Reede Djoeana lies south-eastward of a line drawn in an 056° direction from the chimney of the Tarangkil sugar factory, (*Lat. 6° 40′ S., Long. 111° 05′ E.*), situated about 7 miles southward of the mouth of Sungei Tajoe. Reede Mergatoehoe lies north-westward of this line.

Reede Rembang is bounded by the parallel of Pulau Gedeh and the meridians of Pulau Gedeh and Soealang (Sualang) rif.

Reede Djoeana.—Dangers.—Sungei Djoeana (Juana river) flows out about 16 miles south-south-eastward of Tanjong Boegel (page 100), and there are extensive fish-ponds along the coast between. The mouth of the river is fronted by a mud bank, through which there is a narrow channel with a depth of only one foot (0^{m}3) in it; the entrance is difficult to distinguish, but there is an unofficial beacon with a white ball on the eastern side of the mouth. As vessels lie far offshore, boats should be provided with a compass before landing. There are two dangers to be avoided near the entrance to the river, namely, Laoet (Laut) rif and Djoeana (Juana) rif, 1½ miles northward and 2 miles east-north-eastward, respectively, of the river mouth, both consisting of rocks, which dry; on the latter is a large rock with a bush on it, resembling a stranded prau.

The town of Djoeana (Juana), situated about 2 miles up the river, is difficult to distinguish from seaward, and only under favourable conditions are the red and white roofs of the warehouses visible. Fresh provisions are obtainable. There is a stream tram connecting Djoeana with Semarang and Surabaya.

Vessels of moderate draught usually anchor, in a depth of 4 fathoms (7^{m}3) about 6 miles from the mouth of Sungei Djoeana, bearing between 210° and 225°; from this anchorage the only landmarks near the coast

Charts 1066, 941a, 1263.

Charts 934, plan of Juana and Rembang roads, 1653b.

to be seen are the coconut trees on Maroengan (Marungan), an islet, showing up against the low coast about 5 miles eastward of the mouth of the river (*see* below), and sometimes, when the sun shines on it, the chimney of the Tarangkil sugar factory. Smaller vessels can approach the coast until the summit of Boetak gebergte is in line with Maroengan, bearing about 123°, and anchor in depths of from 2¼ to 2¾ fathoms ($4^{m}1$ to $5^{m}0$); there is no danger of the anchor dragging, as it will sink in the soft mud.

Islets and dangers.—There are numerous islets and dangers in the vicinity of Reeden Djoeana and Rembang, of which the following are the principal:—

Kapajoe (Kapayu), close offshore about 5 miles eastward of the mouth of Sungei Djoeana; it has only a few patches of vegetation on it; the islet is not visible from seaward. Maroengan, from the northern side of which a reef, which dries, extends nearly half a mile. A small reef, named Gondoh, which is not always visible, lies about 2 cables westward of Maroengan. Penowo, about 1½ miles north-north-eastward of Maroengan, is a reef which dries, marked by discoloration when covered, and by breakers in bad weather.

Gedeh is covered with tall trees, and is fringed by a reef, which dries, extending 2 cables from its eastern side. Tjilik (Chilik), half a mile south-eastward of Gedeh, is a sandbank with black rocks on it. Wen Wen, close eastward of Tjilik, is a sandbank above water, with some sunken rocks off its western side. Masaran, about half a mile south-eastward of Wen Wen, is a patch of sand with some sunken rocks northward and north-eastward of it. Toebanan, Tapa, Tengah, and Pinggir, are bare patches of sand, just above water, lying between Tjilik and the coast southward.

Chart 934, plan of Juana and Rembang roads.

Seliro, a reef, about 2 miles south-eastward of Tjilik and about half a mile offshore, is always covered and is difficult to distinguish. Goerian (Gurian), a reef, about 2 miles eastward of Seliro and 7 cables offshore, has a patch of sand, which dries, in the middle of it. Soealang (Sualang), 1½ miles eastward of Goerian and about one mile offshore, consists of a few rocks above water. A small sand patch on its southern extremity dries.

Reede Rembang.—The town of Rembang (*Lat.* *6° 42′ S.*, *Long.* *111° 21′ E.*), 11 miles eastward of Djoeana, can be easily identified by the high, red roof of the Residency, and the white building of the club, with a flagstaff about one cable eastward of it. There is anchorage northward of the town in any suitable depth, mud bottom. The anchorage is calm during the east monsoon, but there is some sea in the west monsoon, and communication with the shore is often difficult during that season. Vessels making for the roadstead should keep in depths of not less than 5 fathoms ($9^{m}1$) until the Residency or the club bears 180°, when the anchorage may be steered for on this bearing.

Cargo is carried from and to the shore by large praus. The Custom house stands on Sungei Gedang, which flows out westward of the town, but praus can only cross the bar at high water, and even then with great difficulty; the duties of Harbour master are carried out by the Assistant Resident. Fresh provisions are obtainable; rain water is collected in tanks, but can only be obtained in small quantities by special permission from the Resident. There is communication

Charts 1066, 1653b, 941a, 1263.

Chart 934, plan of Juana and Rembang roads.

with Semarang and Surabaya by steam tram. Rembang is connected to the general telegraph system.

Reede Lasem and approaches.—Light.—Danger.—Lasem, about 5 miles eastward of Rembang, is situated on the Sungei Dasoen (Dasun), which has a depth of only half a foot ($0^{m}2$) on the bar; there is a building yard on the river for small craft. There is anchorage, in depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$), mud, with good holding ground, in the bay between the mouth of Sungei Dasoen and Tanjong Leran, a low bare point about 2¼ miles north-eastward, which is difficult to identify.

A light is exhibited, at an elevation of 30 feet ($9^{m}1$), from a wooden post, at the mouth of Sungei Dasoen.

Gosong bank, about 1¼ miles northward of the light-structure at the mouth of Sungei Dasoen, is partly above water on its southern side.

The roadstead is visited occasionally by vessels of the Koninklijke Paketvaart Maatschappij. Lasem is connected to the general telegraph system, and there is communication with Rembang and Djoeana by steam tram.

Tanjong Bendoh is low and devoid of vegetation; from eastward, a village situated about 2½ cables south-eastward of the point with some isolated coconut trees near it, can be plainly seen.

Chart 1653b.

Coast.—Dangers.—Tanjong Pelaboehan (Pelabuhan), about 2 miles eastward of Tanjong Bendoh, is a rocky spur from Lasem gebergte. Tanjong Kapal, 2¼ miles eastward of Tanjong Pelaboehan, is low and is noticeable for a large tree on it resembling a sailing prau when seen from a distance. Between Tanjong Kapal and Tanjong Petokol, 14½ miles south-eastward, a line of coconut trees extends along the coast, and there are several villages; there is a small native fishing harbour at Kragan village, about 5 miles south-eastward of Tanjong Kapal. Tanjong Petokol is a rocky point, 56 feet ($17^{m}1$) high, and may be identified by the dark trees on it.

Bontjong (Bonchong), a reef, which dries, lies about 3 cables offshore and about 1¼ miles westward of Tanjong Petokol (*Lat. 6° 46′ S., Long. 111° 46′ E.*), and a rock, with a depth of 3 feet ($0^{m}9$) over it, lies about three-quarters of a mile northward of the same point. A shoal, with a depth of 16 feet ($4^{m}9$) over it, lies about 1¾ miles offshore and 3¾ miles eastward of Tanjong Petokol; less depths than those charted were found, in 1908, on the line between this point and Tanjong Awar Awar.

Bantjarledok (Bancharledok) village is situated close eastward of Tanjong Petokol, and there is good anchorage off it in the east monsoon; care should be taken to avoid the dangers near Tanjong Petokol mentioned above. Fresh provisions are obtainable, and drinking water can be brought on board. Bantjarledok is connected to the railway system.

Tanjong Awar Awar, about 11 miles eastward of Tanjong Petokol, is low, but can be easily identified by the hill Kalak Wilis (page 104).

Chart 3311, plan of Tuban road.

Reede Toeban.—Reede Toeban (Tuban), about 10 miles south-eastward of Tanjong Awar Awar, is bounded by the parallel of 6° 50′ S., and on the east by the meridian of 112° 07′ 30″ E. It is open to north-westerly and north-easterly winds, and there is generally considerable swell. The town of Toeban (Tuban) can be readily identified

Charts 1066, 941a, 1263.

Chart 3311, plan of Tuban road.

by some large dark trees and the white chimney of a factory; there is a landing pier with a flagstaff at its inner end. There is no beach, and the houses stand close to the sea behind protection works.

Vessels can anchor in any suitable depth with the flagstaff bearing about 203°. Fresh provisions and excellent drinking water are obtainable.

Chart 1653b.

Coast.—About 3½ miles eastward of Toeban is Rembes village, near the mouth of Kali Daidoeng, and about 3 miles farther eastward Kali Lohgoeng (Lohgung) discharges; both these rivers are only accessible for small craft, and the bridges built across them are visible from seaward. At Brondong village, 7½ miles eastward of the mouth of Kali Lohgoeng, there is a very prominent white house with a zinc roof. Tanjong Kodok, 3¾ miles eastward of Brondong, is rocky. Tanjong Pakis, about 3½ miles farther eastward, is fairly steep and has a wooded hill on it.

Reede van Patjiran (Pachiran), about 2¾ miles eastward of Brondong, is bounded on the west by the meridian of 112° 20′ E., and on the north by the parallel of 6° 50′ S.

Chart 934, plan of Surabaya strait.

Ujong Pangka.—Ujong Pangka, situated about 8 miles eastward of Tanjong Pakis, is the western entrance point of the Western channel to Surabaya; it is very low and difficult to identify, but the white stone houses of Pangka village, about 3 miles southward of the point, can be plainly distinguished against the high coconut trees in the vicinity; the Doodkisten (page 105) are useful marks for identifying Ujong Pangka. Solo rivier flows out here, and in consequence the point is extending rapidly northward (*see* caution on page 72). In the west monsoon there is often a strong east-going current outside the mudbanks extending from Ujong Pangka (*Lat. 6° 51′ S., Long. 112° 33′ E.*) and in the east monsoon a strong west-going current may be expected.

WESTERN CHANNEL TO SURABAYA.—Depth.—The funnel-shaped entrance of the Western channel to Surabaya, which is actually a portion of the strait between Java and Madoera (Madura), lies between Ujong Pangka and Tanjong Modoeng (Modung), 16 miles eastward; this space, however, is almost entirely occupied by an extensive shoal flat named Zee bank, through which is the main navigable channel, which leads close westward of a training wall constructed between Ujong Piring (page 109) and Djamoeang (Jamuang) rif, nearly 7 miles northward. The top of this wall is 10 feet ($3^{m}0$) wide, and is just awash at the highest water level; at the lowest water level the top projects about 7 feet ($2^{m}1$) above water, and the wall is then about 40 feet ($12^{m}2$) wide at the water line. A white tower stands on the wall about 2 miles north-north-eastward of Ujong Piring.

There was a least depth of 26 feet ($7^{m}9$), in 1948, through the buoyed channel over the bar; the bottom both on the bar and farther inside consists of mud and sand.

Middelrug, on the western side of the buoyed channel, is a narrow ridge of hard sand, with a least depth of one fathom ($1^{m}8$) over it.

The coast southward of Ujong Pangka, which forms the western side of the Western channel, is low nearly everywhere and is covered with shrubs.

Charts 1653b, 1653c, 1066, 941b, 2759a.

Chart 934, plan of Surabaya strait.

Tanjong Saoe (Sau), 2¼ miles southward of Fort Erfprins, situated 2¼ miles west-north-westward of Ujong Piring, is the south-eastern extremity of the former island Menari, and may be identified by its high bamboo growth. The channel leading to the mouth of the creek on the northern side of Menari is marked by beacons.

Tanjong Modoeng, the north-western extremity of Madoera, is low, and has two round-topped trees on it. Between this point and Ujong Piring, about 11 miles south-westward, the coast is low and covered with vegetation; farther southward the trees become higher. Geger, a hill, 815 feet (248^{m}1) high, densely wooded, with a flat top, 9½ miles south-eastward of Tanjong Modoeng, is noticeable when approaching the Western channel; a hill, 210 feet (64^{m}0) high, which is precipitous on its northern side, lies about 3¼ miles south-eastward of Tanjong Modoeng; both these hills have light-coloured patches on them. Kampek, 450 feet (137^{m}2) high, with a round summit, 6¼ miles westward of Geger, is also noticeable, but it is not so prominent as Geger.

Reede Bangkalan is the area of shoal water southward of the parallel of 7° 00′ S. between the training wall and the north-western side of Madoera.

Winds.—During the east monsoon the sea breeze is northerly, and commences about noon, decreasing towards the evening; about sunset the land breeze sets in from southward. It is frequently calm and hazy in the early mornings.

During the west monsoon the wind usually blows strongly in the forenoon from north-west and west-north-west; it remains throughout the day in this direction, and then gradually changes over to a light south-westerly land wind at night.

Fishing stakes.—There are numerous fishing stakes, standing in depths up to 25 feet (7^{m}6) near the edges of the channel. The large stakes usually project from 3 to 6 feet (0^{m}9 to 1^{m}8) above high water; the smaller stakes are only placed on drying banks, and afford good marks when the banks submerge.

Tidal streams.—The horizontal movement of the water in the Western channel is tidal; the east monsoon, however, forces up the water in the funnel-shaped Eastern channel sufficiently to cause a noticeable strengthening of the north-going tidal stream in the Western channel, and a weakening of the south-going stream.

The character of the tidal streams is mixed, but the semi-diurnal stream predominates; the direction is north and south. The following tables are a summary of the semi-diurnal and diurnal tidal streams:—

Off Sembilangan, on the eastern side of the channel about 2 miles southward of Ujong Piring (*Lat. 7° 02′ S., Long. 112° 41′ E.*):

Semi-diurnal.	$\frac{\text{Spring}}{\text{Neap}}$ tide with $\frac{\text{Full and New moon}}{\text{Quarters}}$; maximum rate $\frac{\text{2·4 knots.}}{\text{1·2 knot.}}$ Maximum rate at spring tides $\left\{\frac{\text{N.}}{\text{S.}}\right.$ at $\left.\frac{\text{0100 and 1300}}{\text{0700 and 1900}}\right\}$ From 6 days before to 6 days after spring tides: 45 min. later each day. With neap tides 6 hours later than at spring tides.
Diurnal.	$\frac{\text{Spring}}{\text{Neap}}$ tide: maximum daily rate 0·4 knot. Maximum rate $\frac{\text{N.}}{\text{S.}}$ 1st Jan. at $\frac{1600}{0400}$, 1st July at $\frac{0400}{1600}$; half an hour earlier every week.

Charts 1653b, 1653c, 1066, 941b, 2759a.

Chart 934, plan of Surabaya strait.

Off the mouth of Kali Miring, western side of the channel:

Semi-diurnal.	$\frac{\text{Spring}}{\text{Neap}}$ tide; nil; maximum daily rate 0·3 knot. Maximum rate at spring tides $\left\{\frac{\text{N.}}{\text{S.}}\right.$ at $\left.\frac{\text{0030 and 1230}}{\text{0630 and 1830}}\right\}$ From 6 days before to 6 days after spring tides: 45 min. later each day. With neap tides 6 hours later than at spring tides.
Diurnal.	$\frac{\text{Spring}}{\text{Neap}}$ tide 4 days after the moon's $\frac{\text{greatest declination}}{\text{declination } 0^\circ}$; maximum rate $\frac{\text{0·4 knot.}}{\text{0·2 knot.}}$ Maximum rate $\frac{\text{N.}}{\text{S.}}$ 1st Jan. at $\frac{1530}{0330}$, 1st July at $\frac{0330}{1530}$.

In the entrance to the Western channel the times of slack water and of maximum rate are about the same as for Sembilangan (*Lat. 7° 04′ S., Long. 112° 41′ E.*)

Tide-gauge.—A prominent white tide-gauge hut on iron piles stands on the south-western side of Djamoeang rif.

Pilots.—Pilots employed on the outer pilotage service can be obtained from the pilot light-vessel off the entrance to the Western channel, and will take vessels from the light-vessel to Surabaya road and *vice versa*; for the harbour pilotage service between the roadstead and harbours, *see* page 116. Pilotage is compulsory, except for vessels of less than 5,297 cubic feet (150^{m}3) capacity; under certain circumstances, such as a heavy sea, vessels of less than 35,317 cubic feet (1,000^{m}3) capacity may proceed without a pilot. The request for a pilot should be made to Surabaya by radio at least one day before arrival. For Pilot signals, *see* page 11. When embarking the pilot, vessels are requested to keep in the vicinity of the pilot light-vessel.

Light-vessel.—A pilot light-vessel with a grey hull and the name *Westervaarwater Soerabaja* in white letters on both sides, is moored on the western side of the leading line off the entrance to the Western channel about 11½ miles northward of Ujong Piring; the light is exhibited at an elevation of 56 feet (17^{m}1).

Lights.—Three leading lights are exhibited at the northern end, on the eastern side of the Western channel; Mapia, the front light, is exhibited, at an elevation of 16 feet (4^{m}9), from a white beacon, about 2¾ miles north-north-eastward of Ujong Piring; the middle light is exhibited, at an elevation of 43 feet (13^{m}1), from a white iron framework structure, 46 feet (14^{m}0) in height, on Ujong Piring; Sembilangan, the rear light, is exhibited, at an elevation of 174 feet (53^{m}0), from an iron tower, the upper part black and the lower part white, 190 feet (57^{m}9) in height, about 1¾ miles south-south-westward of Ujong Piring. These lights in line, bearing 199½°, lead over the bar.

Outer roadstead.—The outer roadstead for deep draught vessels is the area northward of the 3-fathom (5^{m}5) line outside Zee bank, bounded eastward and northward by the arc of a circle with a radius of 6 miles from a position in lat. 6° 51′ S., long. 112° 45′ E., and north-westward by a line drawn as a tangent to the circle from the northern extremity of Ujong Pangka.

Charts 1653b, 1653c.

Bar and approaches.—Beacons.—Buoyage.—A beacon stands on the north-western extremity of Djamoeang rif.

Charts 1066, 941b, 2759a.

Charts 1653b, 1653c.

A light-buoy, painted black, and exhibiting a *white flashing* light *every eight seconds*, and equipped with a radar reflector, is moored about 18 miles northward of Djamoeang rif beacon.

Chart 934, plan of Surabaya strait.

A light-buoy, painted white, and exhibiting a *white flashing* light of *five seconds* duration *every twelve seconds*, is moored about 9 miles northward of Djamoeang rif beacon.

A light-buoy, painted black, and exhibiting a *white flashing* light of *three seconds* duration *every twelve seconds*, and a red conical buoy are moored about 7¼ miles north-westward and 5 miles north-north-westward, respectively, of Djamoeang rif beacon.

A black can buoy, surmounted by a truncated cone, is moored about 9 miles north-eastward of Djamoeang rif beacon (*Lat. 6° 56′ S., Long. 112° 44′ E.*).

The narrow channel across the bar at the entrance to the Western channel is marked as follows :—

On the eastern side :—By two conical light-buoys, painted black, moored, respectively, about 3 and 2½ miles north-north-eastward of Djamoeang rif beacon ; the outer exhibits a *white flashing* light of *three seconds* duration *every nine seconds*, the inner No. 18, exhibits a *red flashing* light of *two seconds* duration *every eight seconds*.

A light-buoy, painted black, and exhibiting a *red flashing* light of *two seconds* duration *every six seconds*, about 2½ miles south-south-westward of Djamoeang rif beacon.

On the western side :—By a white conical buoy, No. 17, surmounted by a ball, and a conical light-buoy, No. 16, exhibiting a *green flashing* light *every eight seconds*, moored, respectively, about 2½ and 1½ miles northward, of Djamoeang rif beacon.

A light-buoy, painted white, and exhibiting a *green flashing* light of *two seconds* duration *every six seconds*, about 2½ miles south-south-westward of Djamoeang rif beacon.

A white conical buoy, No. 15, surmounted by a ball, and a conical light-buoy, No. 14, painted black, exhibiting a *white flashing* light of *five seconds* duration *every fifteen seconds*, moored, respectively, about 3¾ and 2½ miles northward of Ujong Piring light-structure.

A green spherical buoy is moored at the outer end of the dredged channel, about 3¼ miles northward of Djamoeang rif beacon, and a beacon is situated on the western side of the channel about 1¾ miles northward of the same beacon.

Channel from inside bar to Surabaya roadstead.—Beacon.— About midway between Ujong Piring and Ujong Slempit (Sembilangan) is a stone pier, close southward of which is Sembilangan village, which is difficult to distinguish. Ujong Slempit may be identified by the lighthouse on it, and there is a landing pier here. Tanjong Boeloe (Bulu), about one mile southward of Ujong Slempit, is densely wooded with high trees. Tanjong Djoenganjar (Junganjar), 1¾ miles south-south-eastward of Tanjong Boeloe, has some coconut trees on it.

Chart 934, plan of Surabaya strait.

On the western side of the channel there is a beacon on the shore bank, about one mile northward of Fort Erfprins.

Kali Miring flows out through the mud flat occupying the bight between Tanjong Saoe and the unimportant village Grissee (Grisee),

Chart 934, plan of Surabaya strait.

about 5½ miles southward; the edge of this mud flat, which bounds the western side of the channel to Surabaya, is steep-to. Kali Miring had a least depth, in 1924, of 3 feet ($0^{m}9$) in the approach channel; it is a tributary of the Solo rivier, which originally flowed out about 2 miles northward of Fort Erfprins, but the mouth has been closed. The channel leading to Kali Miring is marked by buoys.

Grissee is connected with Surabaya by a steam tram and steamboat service. A pier extends to the edge of the mud-flat; there are usually a few coasting vessels lying off the place. Giri hills, about 1¾ miles south-westward of Grissee, are fairly prominent; Petoekangan (Petukangan) is the south-eastern summit.

Reede Grissee is bounded by the meridian of the eastern extremity of Tanjong Semamboeng (Semambung) and the parallel of 7° 08′ 30″ S.

Tanjong Semamboeng (*Lat. 7° 11′ S., Long. 112° 40′ E.*) lies about 1½ miles southward of Grissee, and Kali Lamong (Tangi) flows out about one mile farther southward; the tortuous channel through the bank leading to the entrance of this river is marked by buoys. The bight between Tanjong Semamboeng and Surabaya is occupied by a steep-to bank of mud and sand.

Dangers. — Buoyage. — Lights. — A light-buoy, painted white, and exhibiting a *white flashing* light of *two seconds* duration *every eight seconds*, is moored on the western side of the channel, about 1½ miles west-south-westward of Ujong Piring light-structure.

A white conical buoy is moored on the western side of the channel, about 1¾ miles southward of Tanjong Saoe.

Van Drieen rif, with a depth of 2½ fathoms ($4^{m}6$) over it, lies nearly in mid-channel, 1¾ miles northward of Grissee; its eastern side is very steep-to. A light-buoy, painted black, and exhibiting a *white flashing* light of *five seconds* duration *every twelve seconds*, is moored about 2½ cables south-south-westward of Van Drieen rif.

A white conical buoy, No. 3, surmounted by a cone, is moored about 1¼ miles south-westward of Tanjong Tandjoengan (Tanjongan), situated 3½ miles southward of Tanjong Djoenganjar. There is a white cable hut on Tanjong Tandjoengan.

A light is exhibited, at an elevation of 40 feet ($12^{m}2$), from a white iron framework structure, 39 feet ($11^{m}9$) in height, near the root of the pier at Grissee.

Pisangs, on the western side of the channel, 2½ miles south-eastward of Grissee light-structure, is a reef which nearly dries, and is steep-to on its eastern side.

A light is exhibited, at an elevation of 11 feet ($3^{m}4$), from a white beacon on the north-eastern side of Pisangs rif.

A black can buoy, No. 2, surmounted by a truncated cone, is moored about 1¾ cables north-north-eastward of Pisangs light-structure.

Prohibited anchorages.—Anchoring and fishing are prohibited in the vicinity of a submarine cable which crosses the strait in the vicinity of Sembilangan light, in the vicinity of a submarine cable running through the whole of the Western channel and in the vicinity of another cable which crosses the narrowest part of the channel between Tanjong Tandjoengan and Tanjong Semamboeng.

Chart 934, plan of Surabaya road.

Surabaya road.—Surabaya road is bounded on the west by the

Chart 934, plan of Surabaya road.

meridian of the western Buffel, and on the east by the meridian of the triangulation beacon on Kamal.

Buffels are two dark coloured rocks on the edge of the flat which dries, on the northern side of the roadstead, about 7 cables offshore and nearly 1½ miles south-eastward of Tanjong Tandjoengan.

At Tanjong Kamal (*Lat. 7° 10′ S., Long. 112° 43′ E.*), on the northern side of the roadstead, about 2 miles east-south-eastward of Tanjong Tandjoengan, there is a pier for the ferry steamers which ply between this point and Surabaya, on the opposite shore. Kamal village is the terminus of the Madoera steam tram, which runs to Soemenep.

Kamal hill, 276 feet ($84^{m}1$) high, with a white triangulation beacon on its summit, lies about 1¾ miles east-north-eastward of Tanjong Kamal; there is a conspicuous tree about midway between the point and the hill, and a beacon, surmounted by a ball, stands about three-quarters of a mile north-eastward of the point.

There is a pier equipped with a crane about 1¾ miles eastward of Tanjong Kamal, and close westward is a small camber. A beacon, surmounted by a red cylinder, on the western jetty of the camber, in line with a beacon, situated about 3¾ cables eastward of Kamal hill, bearing 042°, leads to the entrance of the camber, in a least depth of 2¾ fathoms ($5^{m}0$). Two mooring buoys are situated about 1½ cables southward of the entrance.

A screw pile is situated on the southern side of a coral reef one mile eastward of the camber, and there is another pile 3 miles farther eastward, and about 6 cables offshore.

The quarantine pier is at Sekarboengoe (Sekarwungu), about 2¼ miles eastward of the camber.

Anchorage.—The anchorage area lies immediately northward of Tandjoeng Perak, situated on the southern shore, and is marked by pecked lines on the plan. It has been swept to a depth of 23 feet ($7^{m}0$).

The roadstead affords safe anchorage, in depths of from 5½ to 12 fathoms ($10^{m}1$ to $21^{m}9$), in both monsoons, and the holding ground is fairly stiff; when a strong wind and tidal stream combine, vessels may occasionally drag. Vessels at anchor are affected by the stream setting out of Kali Mas (page 115) and usually swing with their head south.

Prohibited anchorages.—Anchoring and fishing are prohibited, due to the existence of submarine cables, in the area marked by pecked lines on the plan northward of the Marine harbour, and extending across the roadstead, also in the area, similarly marked, extending north-eastward from the mouth of Kali Semampir, close eastward of the Marine harbour (*see* page 115). There is a degaussing range in this area, and a repair vessel, which displays a red flag by day and exhibits a *white* light at night.

Light.—Dangers.—Beacons.—Buoyage.—A shoal, with a depth of 33 feet ($10^{m}1$) over it, lies about one mile south-south-westward of Tanjong Kamal, and is marked on its western side by a black conical buoy, surmounted by a ball; between this shoal and Tanjong Kamal the depths are very irregular.

Queen Olga rif, with a least depth of 8 feet ($2^{m}4$) over it, lies about 5½ cables south-eastward of Tanjong Kamal.

A light (*Lat. 7° 11′ S., Long. 112° 44′ E.*) is exhibited, at an elevation

Charts 1653b, 1653c, 1066, 941b, 2759a.

Chart 934, plan of Surabaya road.

of 26 feet (7^{m}9), from a white iron beacon, 26 feet (7^{m}9) in height, on the south-eastern side of Queen Olga rif.

A bank, with depths of less than 3 fathoms (5^{m}5) over it, extends about 8 cables east-north-eastward from the light-beacon, the least depth of 5 feet (1^{m}5) being situated about 2¾ cables north-eastward of the light-structure. The south-eastern side of this bank, about 5 cables east-north-eastward of the light-beacon, is marked by a conical light-buoy, which was unlit in 1948, painted in black and white bands. Close eastward of this bank is another one, with depths of less than 3 fathoms (5^{m}5) over it, extending about 1½ miles eastward of the light-beacon, the least depth of 3 feet (0^{m}9) being situated on the northern side, 11½ cables eastward of the light-beacon. This bank is marked on its northern side by two beacons, the eastern of which is surmounted by a truncated cone, and at its eastern extremity by a conical light-buoy, which was unlit in 1948, painted white. There are numerous mooring buoys in the harbour, the positions of which may best be seen on the chart.

Two white conical buoys, each surmounted by a ball, are moored 5¾ cables south-south-eastward and 5 cables south-eastward, respectively, of Queen Olga light-beacon (*Lat. 7° 11′ S., Long. 112° 44′ E.*).

A conical buoy, painted in black and white bands, surmounted by a ball, lies about one mile east-south-eastward of Queen Olga light-beacon. A conical buoy, painted in black and white chequers, surmounted by a cone, lies about 4½ cables farther eastward. Two can buoys, painted in black and white chequers, are moored about midway between these two conical buoys.

A green spherical buoy is moored about half a cable northward of the western entrance point of the Marine harbour, and a black can buoy is moored about half a cable west-north-westward of the same point.

The north-western corner of the anchorage area is marked by a black can buoy, surmounted by a truncated cone.

Tidal streams.—The tidal streams in the roadstead are mixed with a strongly predominating semi-diurnal character, and nearly correspond with those in the Western channel off Kali Miring (*see* page 110), the stream turning at practically the same time. The duration of slack water varies considerably; as a general rule, the stronger the stream the shorter the period of slack water, and *vice versa.* Close inshore the stream turns from one to 1½ hours earlier than in the middle of the road, but it does not correspond with the change in the vertical movement of the water.

The consequence of the piling up in the western part of Straat Madoera is the same here as occurs in the Western channel (*see* page 109). During the south-east monsoon the west-going stream in the roadstead is thus stronger on the average than the east-going stream.

Chart 934, plans of Surabaya strait and Surabaya road.

Seaplane area.—Beacon.—Buoyage.—An area for seaplanes, known as the Morokrembangan seaplane camp, is situated on the flat immediately westward of Tandjoeng Perak, and is marked by pecked lines on the chart.

A light-buoy, No. 1, painted white, and exhibiting a *white flashing* light of *two seconds* duration *every eight seconds*, is moored at the north-eastern corner of the area about 1½ miles eastward of Pisangs rif light-beacon.

Charts 1653b, 1653c, 1066, 941b, 2759a.

Chart 934, plans of Surabaya strait and Surabaya road.

A light-buoy, painted red, and exhibiting a *red flashing* light *every eight seconds*, is moored at the south-eastern corner of the area, about half a mile southward of No. 1 light-buoy. A light-buoy, painted red, and exhibiting a *white flashing* light *every eight seconds*, is moored about one cable west-south-westward of the light-buoy marking the south-eastern corner of the area.

Two light-buoys, painted grey, occasionally exhibiting a *white fixed* light, about one cable apart, mark the entrance to the seaplane camp, about 1½ miles south-eastward of Pisangs rif light-beacon.

Two light-buoys, painted red, from which *red fixed* lights are occasionally exhibited, are moored, respectively, about 9 cables south-south-eastward and 6 cables southward of Pisangs rif light-beacon (*Lat. 7° 11′ S., Long. 112° 41′ E.*). Navigation is prohibited in the seaplane area at all times.

Chart 934, plan of Surabaya road.

Tandjoeng Perak.—Quays.—Lights.—The basin westward of Kali Mas, which discharges into the southern side of the roadstead 3 miles eastward of Pisangs rif light beacon, is known as Tandjoeng Perak, and that eastward of the river is the Marine harbour. The entrance to Tandjoeng Perak is between the western extremity of North pier and the northern extremity of Westhavendam and is about 1¾ cables wide. The northern side of North pier is named Rotterdam quay, and the southern side Amsterdam quay; at the western end is Ijmuiden quay. On the eastern side of Westhavendam is Genua quay. Holland pier extends north-north-westward from the southern side of the basin. Perak quay at the northern end of the eastern side of the basin is used by harbour craft. There are several mooring buoys in the harbour.

A light is exhibited, at an elevation of 52 feet ($15^{m}8$), from a white iron framework structure, 49 feet ($14^{m}9$) in height, on the western side of the entrance to Tandjoeng Perak, and a light is exhibited on a godown on the eastern side of the entrance. A light is exhibited from each of the outer corners of Holland pier.

A light is exhibited, at an elevation of 46 feet ($14^{m}0$), from a white iron framework structure on the eastern side of the entrance to Kali Mas.

The following depths alongside the quays in Tandjoeng Perak were reported in 1949. Rotterdam quay, 23 to 28 feet ($7^{m}0$ to $8^{m}5$); Amsterdam quay, 26 to 28 feet ($7^{m}9$ to $8^{m}5$); Ijmuiden quay, 24 feet ($7^{m}3$); Perak quay, 26 feet ($7^{m}9$); Holland pier, east side, 11 to 28 feet ($3^{m}4$ to $8^{m}5$); west side, 14 to 21 feet ($4^{m}3$ to $6^{m}4$); Genua quay, 16 to 28 feet ($4^{m}9$ to $8^{m}5$).

Marine harbour.—The Marine harbour occupies the area between the right bank of Kali Mas and Kali Semampir. Kruiser quay is situated on the southern side of the pier which forms the northern side of the harbour, and Madoera quay on the northern side; in 1948, there was a least depth of 23 feet ($7^{m}0$) alongside these quays.

A jetty, fitted with pipes for loading and discharging petroleum, extends northward from the western side of the entrance to Kali Semampir; large vessels can go alongside the jetty, and there are several spherical buoys off its outer end. In 1947, there was a depth of 20 feet ($6^{m}1$) alongside this jetty.

Harbour signals.—Vessels of over 400 tons entering the Marine

Chart 934, plan of Surabaya road.

harbour must display the following signals:—For Oosterhaven, a cone, point down; for Westerhaven, a cone point down over a blue pendant. They must not enter the harbour until the same signal is displayed from the Marine Kruiser Kazerne (*Lat. 7° 12′ S., Long. 112° 44′ E.*) on the Madoera quay, on the eastern side of the entrance. Out-going vessels must not leave until the same signal, with the addition of a ball, is displayed on the other signal mast. Out-going vessels have precedence. If one of the above signals is already displayed no vessel may enter or leave or move in the harbour.

Pilotage.—Pilotage by pilots of the Harbour pilot service is compulsory, except for merchant vessels of less than 150 tons.

Vessels entering or leaving the Marine harbour must have a pilot appointed by the Director of the Marine Establishment. For Pilot signals, *see* page 11.

Surabaya.—Surabaya, known by the Dutch as Soerabaja, the most important town in Java, except Batavia, stands on the banks of Kali Mas, which is navigable for small vessels. The old or lower town is situated about 3 miles up the river, and mainly consists of Government and commercial buildings. The tower of the Governor's office is conspicuous. The upper or new town extends southward to a distance of about 8 miles from the harbour. The population, in 1947, was 382,560.

Harbour facilities.—Large supplies of coal are usually stocked by various private firms; coal can be taken in alongside Genua quay or from lighters. There is a coal depôt at the Marine harbour, and foreign warships can be supplied from this depôt if the private firms have not sufficient in stock. Oil fuel can be taken in alongside Rotterdam quay and at Semampir pier; men-of-war may also oil alongside Madoera quay, and merchant vessels in case of necessity.

Fresh provisions are plentiful. Water is laid on to all the quays, and can be supplied to men-of-war lying in the road by water lighters on request to the Harbour master.

There are two powerful tugs, one of which is fitted with pumps for extinguishing fires; a floating fire engine is available at all times for use in the harbours or roadstead, and in the Marine harbour there is also a floating fire engine. Letter " K " of the International Code of Signals is the call signal for tugs, and letter " V " on the siren or whistle indicates fire on board.

Large repairs to vessels can be carried out by the Marine Establishment and by the Soerabaja Drogdok Maatschappij; there are also three private firms, which have floating cranes with lifting capacities of from 15 to 200 tons. There are three graving docks and several floating docks; details of the largest of each of these are given in Appendix I.

Compasses can be adjusted at the Marine Establishment. The degaussing range is open daily for men-of-war from 0800 to 1600, and for merchant vessels after consultation with the de-magnetising service.

The Harbour office, together with the offices of the Nieuwe Kleine Boom, is a building with a cupola-shaped tower situated on the north-eastern corner of Rotterdam quay (*Lat. 7° 12′ S., Long. 112° 44′ E.*).

Charts 1653b, 1653c, 1066, 941b, 2759a.

Chart 934, plan of Surabaya road.

The office of the Harbour doctor is situated at the eastern end of the North pier, near the Customs, Police, and Emigration offices. There are several hospitals in Surabaya (*Lat. 7° 12′ S., Long. 112° 44′ E.*) available for military and civil cases.

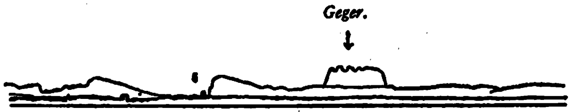
Communication.—Surabaya is connected to the telegraph, telephone and railway systems of Java. The harbour is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and various European steamship lines. There is an air mail service with Europe and Australia. There is a radio station, *see* page 10.

Trade.—The principal exports are sugar, kapok, coffee, tobacco, tapioca, rubber, molasses, and copra; the chief imports are textiles, yarns, tools, motors, machinery and piece-goods.

Chart 934, plan of Surabaya strait.

Directions for the Western channel.—In the west monsoon there is little difficulty in making the entrance to the Western channel; during the east monsoon, especially in the morning, the prevailing mist will frequently hide the coastal hills of Java and Madoera, but the coast may be approached into a depth of 11 fathoms ($20^{m}1$).

Approaching from westward, the flat-topped hill Malang and the Doodkisten are useful landmarks (*see* view A on chart 934). Vessels from eastward can obtain their position by the hills on Madoera. The most conspicuous are Beroekoeng (Berukung), a hill 749 feet ($233^{m}3$) high, (chart 1653c), 17 miles eastward of Tanjong Modoeng, with a small group of high trees on its otherwise bare summit; Bangsereh, 8½ miles eastward of Tanjong Modoeng with a round-topped tree on its north-western slope; Tegiring, about 2 miles north-westward of Bangsereh, consisting of three hills near the coast, the western having a round summit, and the eastern a conical summit; Geger and Kampek (page 109) lie 9½ miles south-eastward and 7½ miles southward, respectively, of Tanjong Modoeng.



Geger bearing 131°, distant 15 miles

(*Original dated* 1931.)

A vessel should approach the outer end of the dredged channel steering 180°, passing about half a mile eastward of the pilot light-vessel; when she is about a quarter of a mile from the outer black light-buoy marking the outer end on the eastern side of the dredged channel she should steer 221° until the leading light-structures are in line, bearing 199½°, passing north-westward of this light-buoy; she should then keep on this alignment, taking care not to get westward of it thence to No. 16 light-buoy. She should then be guided by the buoyage and after passing between No. 14 light-buoy and Mapia light-structure she should steer about 220° until the head of the stone pier situated about midway between Ujong Piring and Ujong Slempit, bears 180°, when she should alter course southward and keep in mid-channel, passing eastward of the light-buoy marking Van Drieen rif and thence north-eastward of Pisangs rif light-beacon.

At night, after the leading line is abandoned, the vessel can proceed through the channel by bearings of Sembilangan and Grissee lights.

A vessel leaving Surabaya roadstead at night should steer for Grissee light, bearing 308°, until Pisangs rif light (*Lat. 7° 11′ S., Long. 112° 41′ E.*) bears about 151°, when a northerly course may be steered for the light-buoy marking Van Drieen reef; vessels of deep draught should pass eastward of this light-buoy.

EASTERN CHANNEL TO SURABAYA.—The eastern approach to Surabaya from Straat Madoera is through a swept channel, one cable wide, the outer end of which is marked by No. 8 light-buoy (*see* below), and thence passing through Jansen's channel, which lies from about one to 4 miles from the Java coast, between it and De Tong (the Tongue), a bank of very hard sand. The channel is marked by beacons and light-buoys, and, in 1949, was swept to a least depth of 14 feet (4^m3).

The bottom throughout consists mainly of soft mud. Fishing stakes are to be found as in the Western channel (*see* page 109); the larger kind are usually found in Jansen's channel, up to the edge of the banks, on the western side of De Tong and under the Madoera shore; the smaller kind stand on the drying parts.

Tidal streams.—The tidal streams in the Eastern channel are mixed, with a strongly predominating semi-diurnal character; the stream turns at practically the same time as in the roadstead (*see* page 114).

In the south-eastern approach to Surabaya, about 19 miles south-eastward of Tanjong Kamal, the rate of the stream seldom exceeds 2 knots; when it attains this rate there is usually a stream of 3 knots in the roadstead. The rate of the stream in the buoyed channel and in Jansen's channel is about the same, but on the banks bordering them the rate seldom exceeds one knot. The stream sets mainly in the direction of the channels.

Prohibited area.—An area prohibited for navigation, in which bombing and firing exercises are carried out, is situated in the approach to Jansen's channel, extending as far south as Lat. 7° 20′ S., and eastward to long. 113° 07′ E.

Northern side of the Eastern channel.—Within the low coast of Madoera, forming the northern shore of the Eastern channel to Surabaya, rises a range of hills of which the following are the most prominent summits from east to west:—Telok, 13½ miles eastward of Kamal hill, the westernmost summit of a bare ridge; Seleret, about 1¾ miles westward of Telok, with four very prominent knobs close together; Kemiri, about 4½ miles farther westward and at the western end of the range, is a very prominent saddle.

Near the coast are a few noticeable trees, as shown on the chart. There is a tide-gauge hut off Gading village, 10 miles eastward of Kamal hill, but it is inconspicuous; the remains of an old fort, with a depth of one foot (0^m3) over it, lies about one mile southward of the tide-gauge. There is a prominent white tide-gauge hut on the eastern side of the entrance to the buoyed channel, about 8 miles southward of Gading village.

Western side of the Eastern channel.—Dangers.—Beacons.—The Java shore, eastward and southward of Surabaya, is low and

Chart 934, plan of Surabaya strait.

overgrown with brushwood, affording no noticeable landmarks; a bank of sand and mud dries out, from a half to one mile.

Kleta rif, about 3 miles off the Java shore and nearly 12 miles south-south-eastward of Kamal hill, consists of stones, covered with sand in places, and has a depth of one foot (0^m3) over it; it is not marked by discoloration, and seldom breaks. A beacon stands on the northern extremity of the reef.

A beacon, surmounted by a black and white vertically striped cone, stands about 2 miles westward of Kleta rif.

Karang Lantoeng (Lantung), about 1¼ miles north-westward of Kleta rif (*Lat. 7° 20′ S., Long. 112° 52′ E.*), is nearly awash, and not marked by discoloration.

Chart 1653c.

Jansen's channel and approach.—Beacons.—Buoyage.—A light-buoy, No. 8, painted in red and black horizontal bands, exhibiting a *white flashing* light of *five seconds* duration, *every fifteen seconds,* and a light-buoy, No. 7, painted white, exhibiting a *white flashing* light of *three seconds* duration, *every eight seconds,* are moored about 9 and 7 miles, respectively, south-eastward of Kleta rif beacon.

Chart 934, plan of Surabaya strait.

A red can buoy, No. 6, surmounted by a red cone, is moored about 4½ miles south-eastward of Kleta rif beacon.

A conical light-buoy, No. 5, painted white, exhibiting a *white flashing* light *every twelve seconds,* is moored on the eastern side of the swept channel, about 2½ miles east-south-eastward of Kleta rif beacon.

Two beacons, named Castor and Pollux, each equipped with a reflector, are situated on the central line of the swept channel, about one mile east-north-eastward and 1¾ miles northward, respectively, of Kleta rif beacon.

A conical light-buoy, No. 4, painted in black and white horizontal bands, exhibiting a *white flashing* light of *five seconds* duration, *every fifteen seconds,* is moored about 2¾ miles north-westward of Pollux beacon.

Two beacons, each consisting of a screw pile, are situated on the western side of the channel, about 2 and 3½ miles, respectively, north-westward of Pollux beacon, and a similar beacon stands on the eastern side of the channel, about 5 miles north-westward of Pollux beacon.

A black and white chequered buoy, No. 3, surmounted by a truncated cone, is moored about 3½ cables south-westward of the screw pile beacon standing on the eastern side of the channel.

A light-buoy, No. 2, painted white, exhibiting a *white flashing* light of *three seconds* duration, *every eight seconds,* is moored about 2½ miles north-westward of the screw pile beacon standing on the eastern side of the channel.

Two screw pile beacons stand on the western side of the channel, about 3 and 3½ miles, respectively, north-westward of the northern screw pile beacon marking the western side of the channel mentioned above. About one mile farther north-westward is a black iron beacon, surmounted by a cone; passage between this beacon and the Java coast is prohibited.

A white conical buoy, No. 1, surmounted by a ball, is moored about three-quarters of a mile north-westward of the black iron beacon.

Charts 1066, 941b, 2759a.

Chart 934, plan of Surabaya strait.

Pilots.—Pilotage is compulsory. The pilot vessel will cruise near No. 7 light-buoy. For pilot signals, *see* page 11.

Prohibited anchorage.—A submarine cable is laid across the strait from a position about three-quarters of a mile eastward of Kamal hill to a point on the Java shore about three-quarters of a mile north-westward of Kedoeng (Kedung), situated about 4 miles south-eastward of Tanjong Kamal; a notice board marks each landing place, and anchoring and fishing are prohibited within one cable on either side of this cable. *See* page 14.

Measured distance.—Beacons.—A distance of 7,514 feet ($2,290^{m}4$) is measured off the south coast of Madoera eastward of Kamal hill (*Lat. 7° 10′ S., Long. 112° 45′ E.*); the marks consist of two pairs of iron posts, with white rectangular framework daymarks. The running line is in the direction of 088½° and 268½°, and is eastward of the red conical buoy, surmounted by a ball, about one mile south-south-eastward of Kamal hill.

The two eastern posts in line, bearing 345°, form a good mark for testing compasses.

Just westward of the eastern pair of posts for the measured distance there are some houses and a pier.

Chart 1653c.

Island and dangers eastward of the Eastern channel.—Lights.—Beacon.—The following description of the dangers eastward of the Eastern channel, although in the deep part of Straat Madoera, is given here as more convenient when approaching Surabaya from eastward:—

Kambing, an island, 96 feet ($29^{m}3$) high, and densely wooded, lies 5 miles off the south coast of Madoera, and 20 miles eastward of the beacon marking Kleta rif; *see* also on page 134.

A light (*Lat. 7° 21′ S., Long. 113° 10′ E.*) is exhibited, at an elevation of 36 feet ($11^{m}0$), from a white iron framework structure, 26 feet ($7^{m}9$) in height, on Manila, a steep-to rock which dries, about 3¾ miles south-westward of Kambing.

Sirumpa, a rock which dries on its south-eastern side and steep-to, lies 6¾ miles south-westward of Manila; it is marked by a beacon surmounted by two balls.

Eendrachts rock or Karang Chongkeh, is a steep-to rock, with a depth of 3 feet ($0^{m}9$) over it, lying 8 miles southward of Manila light-structure.

A light is exhibited, at an elevation of 53 feet ($16^{m}2$), from a white iron tower, 52 feet ($15^{m}8$) in height, on Zwaantjes droogte, about 7½ miles south-south-westward of Manila light-structure; this reef consists of coral, rock and sand; a sandbank on its western side is always above water.

Bura reef is a hard patch with a rock, which dries, on it, 5½ miles west-north-westward of Zwaantjes droogte light-tower.

Tidal streams.—At Zwaantjes droogte the west-going stream commences and reaches its maximum rate about four hours earlier than the north-going stream at Sembilangan (page 109). The east-going stream commences and reaches its maximum rate about four hours earlier than the south-going stream at Sembilangan.

Directions for the Eastern channel.—The hills on Madoera described on page 118 afford good marks for the Eastern channel. As

Charts 1066, 941b, 2759a.

Chart 1653c.

soon as the light-tower on Zwaantjes droogte is sighted, course may be shaped for No. 7 light-buoy and thence the buoyed channel should be followed.

Inward bound vessels should anchor near No. 8 light-buoy when waiting for a pilot, but may proceed to meet him between Nos. 7 and 8 light-buoys. 5

Charts 1066, 941b, 2759a.

CHAPTER VI·

STRAATEN MADOERA AND SAPOEDI—MADOERA, BAWEAN, SAPOEDI AND KANGEAN EILANDEN

Chart 1653c.

STRAAT MADOERA.—Straat Madoera (Madura) is the wide channel between the island of Madoera and the eastern portion of Java. There are no dangers in it except those described at the end of the previous chapter.

Climate and weather.—*See* page 17.

Local weather.—The monsoons in Straat Madoera are feeble, but the easterly is the stronger; the high lands on both sides cause land and sea breezes, which materially interfere with the steadiness of the periodic winds. On the southern side of the strait the wind will be steadiest at night, and in conjunction with the land breeze will draw into south-south-east; in daytime the opposition of the sea breeze will cause the wind to be less reliable in strength and direction. On the northern side of the strait it is the day winds from south and south-east that are steadiest and the night winds that are generally feeble and variable.

The westerly monsoon, owing to the large masses of land to windward, is greatly impeded, January and February being the only months during which it blows with reliable steadiness, and then from west to west-north-west. At this season the wind is more constant near the Java coast in the daytime, and on the Madoera side at night.

A cloudless but very hazy sky is the prevailing feature of the easterly monsoon, and rain seldom falls. From June to September considerable sea may roll in from eastward, and, when in opposition to the tidal stream, will cause a short choppy sea. The rainy period is from December to March, when about one day in three will be wet. Squalls and thunderstorms are infrequent.

Currents and tidal streams.—The horizontal movement of the water in Straat Madoera is a mixture of monsoon currents and practically semi-diurnal tidal streams. In the vicinity of Zwaantjes droogte (page 120) the latter predominate, and near Meinderts droogte (page 132) the west or east monsoon currents predominate; between these two positions the conditions are variable.

Charts 1066, 941b, 2759a.

Chart 1653c.

Tidal streams at Zwaantjes droogte.

Character: almost entirely semi-diurnal. Direction: West or East

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$\frac{\text{Spring}}{\text{Neap}}$ tide one day after $\frac{\text{Full moon and new moon}}{\text{Quarters}}$; maximum rate $\frac{\text{1·5 knots.}}{\text{0·5 knot.}}$

Maximum rate at spring tides $\left\{\frac{\text{W.}}{\text{E.}}\right.$ at $\left.\frac{\text{0900 and 2100}}{\text{0300 and 1500}}\right\}$ From 5 days before to 5 days after spring tides, 45 min. later each day. With neap tides 6 hours later than at spring tides.

Tidal streams along the Java and Madoera coasts.

Character: almost entirely semi-diurnal. Direction: West-south-west to West or East-north-east to East

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$\frac{\text{Spring}}{\text{Neap}}$ tide one day after $\frac{\text{Full moon and new moon}}{\text{Quarters}}$; maximum rate $\frac{\text{0·5 knot.}}{\text{0 knot.}}$

Maximum rate at spring tides $\left\{\frac{\text{WSW. to W.}}{\text{ENE. to E.}}\right.$ at $\left.\frac{\text{0815 and 2015}}{\text{0215 and 1415}}\right\}$ From 5 days before to 5 days after spring tides, 45 min. later each day. With neap tides 6 hours later than at spring tides.

Tidal streams at Meinderts droogte.

Character: almost entirely semi-diurnal. Direction: South-west by south or North-east by north

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$\frac{\text{Spring}}{\text{Neap}}$ tide 1½ days after $\frac{\text{Full moon and new moo}}{\text{Quarters}}$; maximum rate $\frac{\text{0·7 knot.}}{\text{0·2 knot.}}$

Maximum rate at spring tides $\left\{\frac{\text{SW. by S.}}{\text{NE. by N.}}\right.$ at $\left.\frac{\text{1100 and 2300}}{\text{0500 and 1700}}\right\}$ From 5 days before to 5 days after spring tides, 45 min. later each day. With neap tides 6 hours later than at spring tides.

As the monsoon current predominates at Meinderts droogte, the tidal streams are only noticeable during the half-yearly transition periods; how far northward the influence of the strong stream from Straat Bali is felt along the eastern end of Java has not been ascertained.

The monsoon currents have mainly an easterly or westerly direction, and naturally attain their maximum rate at the strength of the monsoon; in the eastern part of Straat Madoera they predominate over the tidal streams, but in the western part, near the Eastern channel to Surabaya, they have little effect on them.

SOUTHERN SIDE OF STRAAT MADOERA.—Coast.—The Java coast, forming the southern shore of Straat Madoera from Tanjong Tambak Agoeng (Agung) (*Lat. 7° 27′ S., Long. 112° 49′ E.*), about 14 miles south-south-eastward of Surabaya, to Tanjong Ketah, 55 miles east-south-eastward, is fringed by a bank of mud and sand, which dries, with no outlying danger except Katon rif (page 126) and Kerandji (Keranji) rif (page 127). This coast can be safely approached by sounding, except in the vicinity of Tanjong Bedoelan (Bedulan), which is steep-to.

Charts 1066, 941b, 2759a.

Charts 1653b, 1653c.

Mountains.—Behind the lower coastal land are numerous mountains and hills, the following being the most noticeable :—

Penanggoengan, a steep conical mountain, 5,417 feet (1,651^{m}1) high, about 15 miles south-westward of Tanjong Tambak Agoeng. Ardjoeno (Arjuno), about 9 miles southward of Penanggoengan, appears from eastward as a wide ridge with three peaks ; Welirang, the northern of these, and Ardjoeno, the southern, which is 10,965 feet (3,342^{m}1) high, are very sharp, whilst the middle one is more rounded. About 13 miles south-westward of Ardjoeno is Kawi gebergte, of which Boetak (Butak), the southern summit, 9,426 feet (2,873^{m}0) high, and rounded, is prominent.

Chart 1653c.

Tengger gebergte, about 24 miles south-eastward of Ardjoeno, attains an elevation of 9,126 feet (2,781^{m}6), and constitutes one of the most remarkable volcanoes in Java, rising from a very large base, in a gradual slope on the northern side, to a crater of irregular shape ; none of the surrounding peaks is conspicuous. Between Tanjong Warangan, about 17 miles south-eastward of Tanjong Tambak Agoeng, and Probolinggo, 12½ miles farther south-eastward, the summit of Smeroe (Smeru), a massive, conical volcano with two peaks, 12,057 feet (3,675^{m}0) high, about 9 miles southward of Tengger gebergte, is seen above the slopes of the latter, and farther eastward Smeroe becomes more noticeable ; heavy clouds of smoke rise from it at intervals.

About 21 miles eastward of Tengger is the active volcano Lamongan, 5,378 feet (1,639^{m}2) high, from which a column of smoke rises continually ; at night a red glow is seen above its summit. About 8½ miles west-north-westward of Lamongan is Penawoengan (Penawungan), 1,703 feet (519^{m}1) high, with a broad, round summit, and close south-westward of it is Paloe (Palu), 1,995 feet (608^{m}1) high, and conical in shape. Parang, about 4 miles north-westward of Lamongan, has a saddle-shaped summit, 1,674 feet (510^{m}3) high, and Weni, 2¾ miles north-north-westward of Parang, is wooded right up to its very sharp summit.

About 13 miles eastward of Lamongan (*Lat. 7° 59′ S., Long. 113° 20′ E.*) is the massive, rugged Ijang (Iyang) gebergte, rising steeply on the southern side to its highest peak, Argopoero (Argopuro), 10,128 feet (3,087^{m}0) high ; on the northern side the range descends gradually to the coast, with several peaks. Saeng, 3¾ miles northward of Argopoera, is 6,897 feet (2,102^{m}0) high, and steep on all sides with a sharp peak ; Siloeman (Siluman) lies about 3½ miles north-eastward of Saeng, and much resembles that mountain, except that it is considerably lower. Krintjing (Krinching) and Sahing, on the eastern side of Ijang gebergte, may be useful landmarks to vessels eastward of Tanjong Ketah.

Near the coast the following hills are noticeable :—

Semongkrong, a ridge, rising from the coast close southward of Tanjong Warangan, is 273 feet (83^{m}2) high ; within about 2 miles eastward of the summit of this ridge are some prominent trees, visible from a considerable distance and forming an excellent mark when the mountain peaks are obscured. Toegel (Tugel), about 6 miles south-eastward of Semongkrong, consists of two conical hills, 276 feet (84^{m}1) high, close together ; there is a noticeable tree on the summit of the eastern hill. Gloegoe (Glugu), a hill, 338 feet (103^{m}0) high, about

Charts 1066, 941b, 2759a.

Charts 1653c.

12 miles east-south-eastward of Toegel, has a small wood on its summit, the trees of which are darker than those on its slope. About 1½ miles north-westward of Gloegoe there is another hill, which can be identified by a plateau on which there are numerous trees; about three-quarters of a mile eastward of this plateau, and situated on the coast, is Pandak, a low hill, on which the white limestone shows through the sparse vegetation.

Loros, 1,765 feet (538^{m}0) high, one of the northern spurs of Ijang gebergte, lies about 1¾ miles inland, and is one of the most prominent mountains along the entire coast; it is visible from a great distance either eastward or westward, and its peculiar conical shape, with a ridge running southward from half way up, is very noticeable; from northward it appears as a single sharp peak.

Chart 3672, plan of Pasuruan road.

Reede Pasoeroean. — Lights. — Danger. — Buoys. —Reede Pasoeroean (Pasuruan), about 25 miles south-south-eastward of Surabaya, is open to northerly and easterly winds, but is safe in the west monsoon; although it sometimes blows hard from the south-west and north-west during the monsoon, communication with the shore is seldom interrupted.

The roadstead is bounded by lines drawn in an 067½° direction and a 319° direction, respectively, from the summit of Bale Pandjang (Panjang), the westernmost of a ridge of hills lying about 4½ miles westward of Pasoeroean, and the western summit of Semongkrong, and by the coast. The monotonous low wooded coast in the vicinity of Pasoeroean affords no prominent landmarks. The town may be identified by the light-structure, a water tower, and a dark group of trees, but the light-structure is difficult to distinguish unless the sun is shining on it; a white tide-gauge hut on piles stands about one mile north-eastward of the light-structure.

A light (*Lat. 7° 37′ S., Long. 112° 55′ E.*) is exhibited, at an elevation of 40 feet (12^{m}2), from a white iron framework structure, 42 feet (12^{m}8) in height, on the western side of the entrance to Gembong rivier; the seaward side of this light-structure is built in, and is painted in narrow black and white vertical stripes.

A light is exhibited, at an elevation of 42 feet (12^{m}8), from a white iron framework structure, 42 feet (12^{m}8) in height, on the beach about 2 miles westward of Pasoeroean light; the seaward side of this light-structure is built in, and has a black vertical stripe.

A shoal, with a depth of 2 fathoms (3^{m}7) over it, lies about 1¼ miles north-eastward of the light-structure on the western side of the entrance to Gembong rivier.

There is suitable anchorage, in a depth of 5 fathoms (9^{m}1), with Pasoeroean light-structure bearing 203°, 2 miles offshore, but owing to its proximity to Surabaya, the roadstead is little used by European vessels. Loading and unloading are carried out by lighters, which can enter Gembong rivier at high water; the mouth of this river is used as a prau harbour. The dredged channel is marked by a white conical and a black can buoy.

The town contains a Residency, hospital, club, etc., and is connected with the principal places in Java by rail, telegraph, and telephone. The harbour office is situated on the left bank of Gembong rivier. Provisions are plentiful.

Charts 1066, 941b, 2759a.

Chart 3672, plan of Pasuruan road.

Coast.—Light.—A light is exhibited on the beach at Djatiredjo (Jati) village, about 4¾ miles east-south-eastward of Pasoeroean light-structure.

Tanjong Warangan, about 2½ miles eastward of the light-structure at Djatiredjo, is a rounded point formed by the spurs of Semongkrong. There are some high trees on the point, which form a good mark from westward, but are difficult to distinguish from eastward; the coast westward and eastward has a monotonous, wooded appearance. When rounding the point it is advisable to keep in depths of not less than 12 fathoms ($21^{m}9$).

Chart 3311, plan of Probolinggo road.

Reede Probolinggo.—Light.—The town of Probolinggo is situated on the Kali Bangor, about 12 miles east-south-eastward of Tanjong Warangan. At the northern end of the town is an oblong basin with quays, which serves as a harbour for praus and lighters. This harbour is entered through a canal, with a depth of 3 feet ($0^{m}9$) in its entrance, running between two stone moles; boats can pass through at mean low water, but as the distance between the piers widens at the outer end, a very turbulent sea may rise in the canal with strong winds.

Probolinggo is connected with the principal places in Java by rail, steam tram, telegraph, and telephone; it is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Fresh provisions are plentiful.

A light (*Lat. 7° 44′ S., Long. 113° 13′ E.*) is exhibited, at an elevation of 46 feet ($14^{m}0$), from an iron tower with black and white stripes, 46 feet ($14^{m}0$) in height, on the head of the western mole.

The road is bounded by a line drawn from the western boundary pyramid to Katon rif (*see* below) thence to the western extremity of Ketapang, and thence to the eastern boundary pyramid. The boundary pyramids are situated about 3¼ miles south-westward, and about 1¾ miles south-eastward, of the light-structure at the head of the western mole.

Off-lying islet.—Danger.—Buoys.—Ketapang, a low, sparsely wooded islet, fringed by a stone and coral reef extending about one cable offshore, lies about 3 miles north-eastward of the heads of the moles; in the middle of the islet is a conspicuous double-topped tree. Katon rif, 2 miles west-south-westward of Ketapang, is a small patch of sand and coral, with a depth of 4½ fathoms ($8^{m}2$) over it; there are depths of from 6 to 8 fathoms ($11^{m}0$ to $14^{m}6$) between this reef and Ketapang.

Katon rif is marked by a black and white chequered conical buoy. A red conical buoy, surmounted by a ball, is moored about 2½ miles eastward of the light-structure on the head of the western mole.

Anchorage.—Directions.—There is good anchorage, somewhat sheltered from north-easterly winds by Ketapang, in a depth of 6½ fathoms ($11^{m}9$), about half a mile northward of the heads of the moles, and with the harbour mouth open. The low, wooded coast in the vicinity of Probolinggo affords few noticeable features, but Ketapang, the light-structure, and the flagstaff on the east mole are good marks for making the roadstead.

There are several sugar factories in the Pasoeroean and Besoeki districts, and, during a part of the year, the electric lights from these factories are visible far out at sea. There are several noticeable white-

Charts 1653c, 1066, 941b, 2759a.

Chart 3311, plan of Probolinggo road.

washed chimneys in the vicinity of Probolinggo; a *red* light is exhibited from one of them situated 2 miles east-south-eastward of the town.

A vessel making for the roadstead from westward should steer for the light-structure in line with Gloegoe, bearing 141°, or the light-structure in line with Weni (chart 1653*c*), bearing 158°; both these alignments lead westward of Katon rif. The passage between Katon rif and Ketapang is safe for vessels of moderate draught; Weni, in line with the boundary pyramid eastward of Probolinggo, bearing 162°, leads eastward of Katon rif and over Karang Nangkok and Karang Moenira (Munira), over which are depths of 7 and 6 fathoms ($12^{m}8$ and $11^{m}0$), respectively.

A vessel approaching from north-eastward should give Ketapang a prudent berth, on account of the fringing reef. Weni, in line with Gloegoe, bearing 178°, leads about 6 cables eastward of this reef.

Chart 1653c.

Coast.—Danger.—The coast between Probolinggo and Tanjong Ketah (*Lat. 7° 42′ S., Long. 113° 42′ E.*), 29 miles eastward, is low and uniform, Loros (page 125) being the only noticeable feature. Tanjong Gending, about 6 miles eastward of Probolinggo, may be identified by a sugar factory, and by a large round-topped tree about 1½ miles southward of the point; about 4¼ miles east-north-eastward of Tanjong Gending is Tanjong Padjarakan (Pajarakan), where a group of high trees stands in the sea, and about 1¼ miles southward of it is a sugar factory, visible from seaward. The point is extending northward.

Tanjong Kraksaän, about 6½ miles east-north-eastward of Tanjong Gending, is formed by some large trees standing in the water, through which Kali Boentoe flows into the sea; Kraksaän village, where a Government official resides, is situated on this river, but is not visible from seaward.

Reede Kraksaän, situated off the village of the same name, is bounded by the parallel of Tanjong Bedoelan (Bedulan), situated 5 miles east-north-eastward of Tanjong Kraksaän, and the meridians of 113° 23′ 30″ E. and 113° 26′ 30″ E. Tanjong Bedoelan is a low sandy point, difficult to identify from the offing; the coast in its vicinity is very steep-to, and the point should be given a wide berth.

There is anchorage northward of Tanjong Kraksaän, in a depth of 10 fathoms ($18^{m}3$). Close to the sea is a large warehouse with a zinc roof; a few miles inland are the Maron and Bagoe sugar factories, which may be seen against the slopes of the high mountains behind. The products from the neighbouring sugar factories are sent down to the roadstead by Kali Boentoe, which is, however, only accessible at high water.

Eastward of Tanjong Bedoelan spurs from Ijang gebergte approach close to the coast, leaving only a narrow strip of sandy beach as far as Temporah, a hill, 322 feet ($98^{m}1$) high, 10 miles eastward of Tanjong Bedoelan.

Reede Binor, about 4 miles eastward of Tanjong Bedoelan, is bounded by the parallel of 7° 40′ 30″ S. and by the meridians of 113° 32′ E. and 113° 34′ 30″ E.

Chart 3311, plan of Besuki road.

Kerandji rif, about 5½ miles eastward of Tanjong Bendoelan, and about 7½ cables offshore, is a steep-to coral patch, with a depth of 8 feet ($2^{m}4$) over it.

Charts 1066, 941b, 2759a.

Chart 3311, plan of Besuki road.

Reede Besoeki.—Light.—Reede Besoeki is bounded by the parallel of Tanjong Ketah, by the meridian of the summit of Temporah, and the coastline. The roadstead is seldom visited. The town of Besoeki (Besuki) stands on the Kali Besoeki, which can only be entered by boats at high water. Fresh provisions may be obtained. A reddish banyan tree by the Resident's house, some round-topped trees close by the light-structure, a flagstaff, and two large warehouses with red roofs near the mouth of the river, are prominent marks.

A light is exhibited, at an elevation of 44 feet ($13^{m}4$), from a white iron framework structure, 46 feet ($14^{m}0$) in height, on the western side of the entrance to Kali Besoeki.

Anchorage.—Directions.—The usual anchorage is in a depth of 10 fathoms ($18^{m}3$), about half a mile offshore and 2¾ cables from the drying bank, with the banyan tree between the two warehouses, bearing about 152°.

A vessel from westward will pass not less than 3½ cables northward of Kerandji rif by steering for the point northward of Temporah, bearing not less than 114° until Loros bears 180°, when she should follow the coast at a distance of about one mile.

From eastward Tanjong Ketah (*Lat. 7° 42′ S., Long. 113° 42′ E.*), a low sandy point fringed by a steep-to bank, should be given a wide berth. The vessel should steer on a westerly course until the banyan tree comes between the warehouses, bearing about 152°, and then steer in on this alignment until Loros is nearly in line with Temporah.

Chart 1653c.

Heavy fishing stakes are liable to be met in an area extending about 3 miles seaward of an approximate line between a position about 4 miles offshore abreast Kerandji rif and Tanjong Patjinan (page 130), and between that point and a position about 12 miles east-south-eastward.

Mountains.—The aspect of Ijang gebergte (page 124) when approaching from eastward is entirely different to that from westward; there are numerous peaks which resemble each other, descending steeply to the coast, and, if navigating close inshore, Argopoera, the highest peak, is withdrawn from view. The most prominent peaks are Smeroe and Krintjing, the latter of which descends fairly steeply on its western side, and on its eastern side merges into the Sahing gebergte, with some sharp peaks, one of which is prominent on account of its resemblance to a large tusk, 4,361 feet ($1{,}329^{m}2$) high.

Charts 3672, plan of Panarukan road, 1653c.

Ranoe (Ranu) gebergte, about 16 miles east-south-eastward of Loros (page 125), has a wide, rounded summit named Beser, 4,272 feet ($1{,}302^{m}1$) high; close to the coast northward of this range is Ringgit gebergte, having several steep and inaccessible peaks of fantastic shape, almost vertical on the western side. The western end, which has an elevation of 4,098 feet ($1{,}249^{m}1$), is the highest part of the range, and is noticeable on account of a cleft and having a steep sloping knob connected to its southern side. Off Panaroekan (page 129) this summit cannot be seen. The northernmost summit of Ringgit gebergte is a sharp cone, and the easternmost summit is also conical. Koekoesan (Kukusan), which has a sharp peak, 1,667 feet ($508^{m}1$) high, lies close eastward of Ringgit gebergte, and about three-

Charts 1066, 941b, 2759a.

Charts 3672, plan of Panarukan road, 1653c.

quarters of a mile south-south-westward of Koekoesan is a very prominent peak, 1,966 feet (599$^{\text{m}}$3) high; Goendil, a hill, 538 feet (164$^{\text{m}}$0) high and easily identified owing to its light red-grey colour and a triangulation pyramid on its summit, lies near the coast, 1¾ miles north-north-eastward of Koekoesan.

Chart 1653c.

Eastward of Panaroekan the spurs from the Ranoe and Ringgit ranges change over to a ridge of rocky hills running in an easterly direction; one of these hills, 401 feet (122$^{\text{m}}$2) high, lies about 5 miles south-eastward of Panaroekan.

Baloeran (Baluran) gebergte, situated at the north-eastern extremity of Java, forms a large crater, broken down on the northern side; this opening is more or less closed by Klosot, 3,081 feet (939$^{\text{m}}$1) high, and which has a rounded shape. The highest point of the crater is a continuous sharp peak 4,088 feet (1,246$^{\text{m}}$0) high, situated on the south-western side; close westward of the crater are two peculiar reddish-brown knobs lying close together, named Koentjir (*Lat. 7° 50′ S., Long. 114° 21′ E.*). From a westerly direction Baloeran gebergte appears as a table mountain with no noticeable peaks.

South-westward of Baloeran gebergte is Idjen (Ijen) gebergte, a lofty range with spurs descending eastward to Straat Bali. At the south-western end of this range, and about 25 miles south-westward of Baloeran gebergte, is Raoeng (Raung), a volcano 10,928 feet (3,330$^{\text{m}}$9) high, with a large plateau on the top, inside which is the crater. Merapi, with a conical summit, is situated about 13 miles east-north-eastward of Raoeng.

Coast.—Buoys.—In the bight between Tanjong Ketah and Tanjong Pasir Poetih (Putih), about 6½ miles eastward, the coast is wooded with high coconut trees. Tanjong Pasir Poetih is very noticeable owing to its clear white beach, and the coastal reef here extends about 2½ cables offshore.

Chart 3672, plan of Panarukan road.

Tanjong Petjaron (Pecharon), 3½ miles east-north-eastward of Tanjong Pasir Poetih, is formed by a conical hill, 204 feet (62$^{\text{m}}$2) high, which appears as an islet when seen from a distance; on the summit is a tomb surrounded by high trees.

Two black and white chequered buoys mark a measured distance about one mile offshore, close westward of Tanjong Petjaron. It was reported, in 1947, that the eastern buoy had disappeared.

Reede Panaroekan. — Lights. — Dangers. — Buoy. — Beacon. —Reede Panaroekan (Panarukan) is bounded by a line joining Tanjong Petjaron and Tanjong Paras, 6½ miles east-north-eastward, and the coast. Panaroekan, situated at the head of the bight between these points, can be identified by numerous warehouses, one of which has a zinc roof. The light structure and flagstaff are difficult to identify. There is a short landing pier near the flagstaff, and a long pier extends over the drying coastal bank about 2 cables south-south-westward of it.

A light is exhibited, at an elevation of 46 feet (14$^{\text{m}}$0), from a red iron framework structure, 46 feet (14$^{\text{m}}$0) in height, on the beach near the landing pier at Panaroekan.

A light is exhibited, at an elevation of 30 feet (9$^{\text{m}}$1), from a white iron framework structure, 26 feet (7$^{\text{m}}$9) in height, on the beach about one mile west-south-westward of Panaroekan light.

Charts 1066, 941b, 2759a.

Chart 3672, plan of Panarukan road.

A shoal, with a depth of 4 feet (1^m2) over it, with a one-fathom (1^m8) patch close southward of it, lies about 2 miles eastward of Tanjong Petjaron and about 6 cables offshore. A 3¾-fathom (6^m9) patch lies just within the 10-fathom (18^m3) line about 3 cables farther eastward. Djamoengan (Jamungan) rif, with a depth of 2¼ fathoms (4^m1) over it, and marked by a white conical buoy on its northern side, lies about 6½ cables north-westward of the eastern light-structure. Several shoals, with depths of from 1¼ to 2 fathoms (2^m3 to 3^m7) over them, lie within 3½ cables westward of Djamoengan rif.

A reef, which is steep-to and dries, extends about 6 cables north-westward from Tanjong Paras (*Lat. 7° 39′ S., Long. 113° 58′ E.*) and the coast south-westward of it. The coast here is mostly covered with thick woods of high coconut trees.

A black beacon surmounted by a cone marks the western side of the bank extending from the mouth of Kali Sampean, which discharges about three-quarters of a mile north-eastward of the eastern light-structure.

Panaroekan is unhealthy, especially in the east monsoon; the Europeans live at Sitoebondo (Situbondo) (chart 1653c), about 3¾ miles up Kali Sampean, which is navigable for light craft only. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and there is a steamboat service to Kalianget (page 138), on the Madoera coast; there is rail, telegraph, and telephone connection with the principal places in Java. Meat can always be obtained at Panaroekan, but other provisions are scarce; drinking water, from artesian wells, can be brought alongside by praus.

Anchorage.—Vessels of moderate size will find suitable anchorage, in a depth of 9 fathoms (16^m5), with the eastern light-structure bearing about 150°, distant three-quarters of a mile; vessels of deep draught should anchor farther outside. From April to December working cargo with lighters can be carried out without difficulty; during the west monsoon, especially in January and February, there is a short sea, so that the lighters cannot be fully laden, and they also have difficulty in coming alongside.

Reede Kalboet.—Kalboet (Kalbut), a village about 2½ miles north-eastward of Tanjong Paras, is a shipping place for sugar from the neighbouring factories, and there is also a considerable amount of native traffic with Sapoedi eilanden, on the northern side of Straat Madoera. The anchorage is off the mouth of a small creek, in a depth of 12 fathoms (21^m9), about 1½ miles offshore, with a large sugar warehouse bearing 135°; this warehouse, however, is not easily seen. It must be borne in mind that the coastal bank is very steep-to, the depths decreasing rapidly within the 10-fathom (18^m3) line.

Coming from westward, the position of Kalboet village can be identified by the numerous trading praus always lying in the roadstead, and the high coconut trees along the coast of Tanjong Paras terminate here. From northward and north-westward Tandjoeng Sari sugar factory, 3 miles south-eastward of the village, seen over the low land, is a good mark from a distance; when closer in this factory is no longer visible, but the houses of the village near the beach will then be seen.

Chart 1653c.

Coast.—Dangers.—Tanjong Patjinan, about 2 miles north-

Chart 1653c.

eastward of Kalboet, is a very steep-to, low, sandy point. There are several noticeable landmarks in this neighbourhood. Southward of Tanjong Pasir, a point about 2½ miles south-eastward of Tanjong Patjinan, is a small wood of coconut trees, only noticeable from westward. From eastward the chimney of Tandjoeng Sari sugar factory can be identified at a great distance. A white telegraph house with a zinc roof at Landangan village, 5½ miles south-eastward of Tanjong Patjinan, is very prominent.

The bay between Tanjong Patjinan and Tanjong Djangkar (Jangkar), 13 miles south-eastward, is obstructed by several reefs, all lying well inside the line joining these two points; Karang Poetih (Putih), the outer of these reefs, lying about 8½ miles south-eastward of Tanjong Patjinan (*Lat. 7° 36′ S., Long. 114° 02′ E.*) and nearly 2 miles offshore, has a depth of 5 feet ($1^{m}5$) over it.

Reede Djangkar. — Light. — Danger. — Beacon. — Reede Djangkar (Jangkar) is bounded by the parallel of 7° 40′ S., the meridian of 114° 10′ E. and the meridian of Tanjong Djangkar.

Chart 3726.

Tanjong Djangkar is a low point covered with high trees. Djangkar (Jangkar), on the coast about 2 miles south-westward of the point, is the shipping place for sugar from the neighbouring factories; it has a very prominent sugar warehouse with a zinc roof, and there are two piers, one being about half a cable in length.

A light is exhibited, at an elevation of 13 feet ($4^{m}0$), from the root of the pier.

A 2½-fathom ($4^{m}6$) patch, marked by a beacon, surmounted by two white balls, lies about 1¼ miles north-westward of the light-structure.

There is good anchorage, especially in the east monsoon, in a depth of 8 fathoms ($14^{m}6$), with the warehouse bearing about 180°, distant 1¼ miles.

Coast.—Beacon.—Tanjong Tjotek (Chotek), about 5 miles south-eastward of Tanjong Djankar, has some scattered trees on it, and Tanjong Loemoet (Lumut), 3¾ miles farther eastward, has a small wood of high trees on it; the slopes of Baloeran gebergte rise close southward of this point. Between Tanjong Tjotek and Tanjong Loemoet there is a chain of islets or sandbanks, plainly visible from a distance, running parallel with the coast and about half a mile from it. Between these islets and the coast there is a narrow channel, with irregular depths of from 4 to 7 fathoms ($7^{m}3$ to $12^{m}8$), where small native craft find shelter.

At Tanjong Soemberbatak (Sumberbatak), about 5 miles south-eastward of Tanjong Loemoet, the narrow strip of low land separating the coast from the mountains disappears entirely, giving place to the rocky slopes of Baloeran gebergte. Close north-westward of Tanjong Soemberbatak are some rocks above water, and on the south-eastern of these is a very prominent tree with a dark round top.

A beacon, surmounted by a white triangle, stands on a hill about one mile south-eastward of Tanjong Soemberbatak.

Tanjong Sedano, 2¾ miles south-eastward of Tanjong Soemberbatak, may be identified by three precipitous rocky cliffs at the extremity of a spur from Baloeran gebergte; southward of this point is a narrow strip of low, wooded land.

For description of the coast southward of Tanjong Sedano, *see* page 177.

Charts 1066, 941b, 2759a.

Chart 3726.

Measured distance.—A distance of 23,547 feet (7,177^{m}1) has been measured off the Java coast between Tanjong Loemoet and Tanjong Soemberbatak, and is marked by two pairs of white beacons. The north-western pair is situated about 8 cables south-eastward of Tanjong Loemoet and the south-eastern pair south-westward of Tanjong Soemberbatak; the running course is 124° or 304°, at a distance of about 2¾ miles from the coast.

Off-lying danger.—Light.—Anchorage.—Meinderts droogte or Karang Mas, about 5½ miles north-eastward of Tanjong Loemoet, comprises a group of five reefs, usually plainly marked by discoloration. The easternmost reef partly dries, and has some shrubs on it; the north-western reef has a depth of 2½ fathoms (4^{m}6) over it, and there are depths of from 5 to 6 fathoms (9^{m}1 to 11^{m}0) over the remainder.

A light (*Lat. 7° 41′ S., Long. 114° 26′ E.*) is exhibited, at an elevation of 53 feet (16^{m}2), from an octagonal tower on screw piles, with three galleries, 52 feet (15^{m}8) in height, situated on the eastern part of Meinderts droogte.

There is good anchorage in the basin between the reefs, in a depth of 24 fathoms (43^{m}9), about half a mile westward of the lighthouse; to reach this anchorage the lighthouse should be steered for bearing 072°. Under favourable conditions of light the southern part of the reef may be crossed, taking care not to approach within half a mile of the lighthouse until past the discoloured water.

Chart 1653c.

NORTHERN SIDE OF STRAAT MADOERA.—Madoera, from its proximity and geological formation, constitutes almost an integral part of Java. The southern coast of the island forms the northern side of Straat Madoera, and its western coast forms the eastern side of the Western channel to Surabaya. The surface of the island is undulating, but nowhere mountainous, the hills in the western portion seldom exceeding an elevation of 800 feet (243^{m}8), while those in the eastern portion range between 1,000 and 1,550 feet (304^{m}8 and 472^{m}4). The eastern extremity is the best cultivated, fair quantities of rice, maize and tobacco being raised, although to a great extent the island is barren and unfertile.

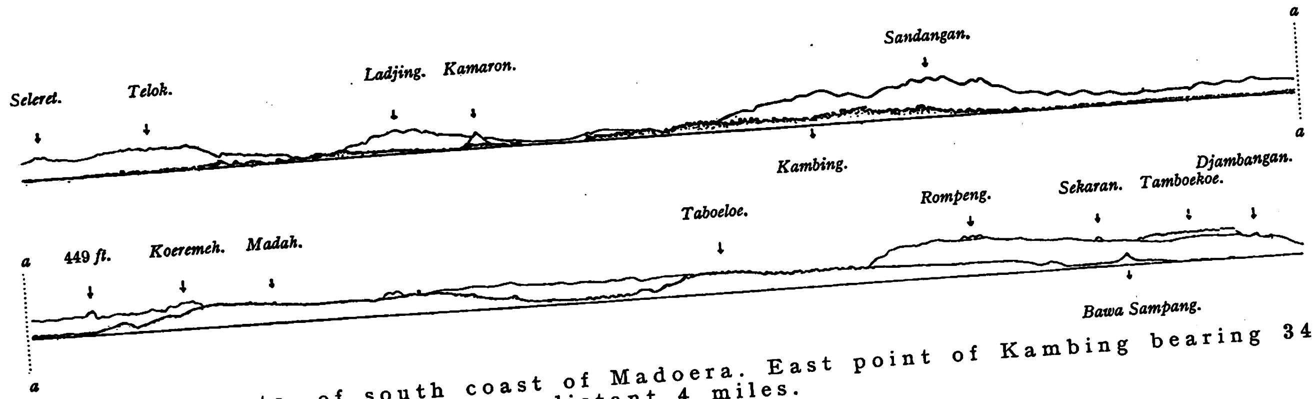
A steam tram service, runs from Bangkalan and Kamal, on the west coast, through Sampang and Pamekasan to Soemenep; the various villages on the north coast are connected together, and also with those on the south coast, by roads.

Aspect.—The principal hills along the south coast of Madoera between Tanjong Goemong (Gumong), on the northern side of the Eastern channel to Surabaya, and Tanjong Padelegan, about 33 miles eastward, are as follows:—

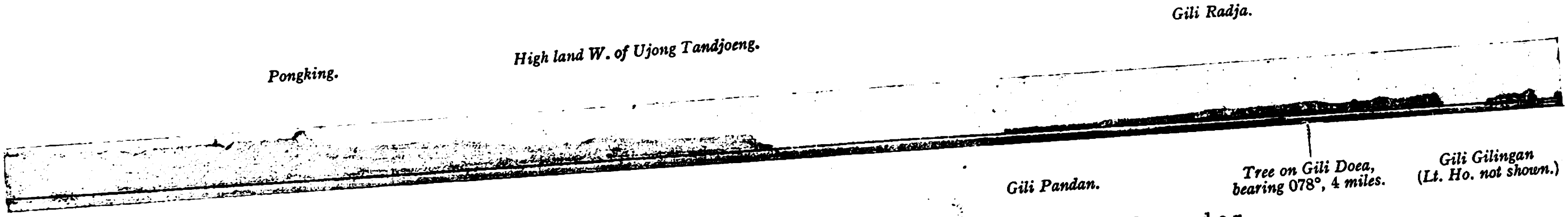
Kamaron, 9 miles north-eastward of Tanjong Goemong, is a prominent peak, 548 feet (167^{m}0) high, with a tree on its summit; Sandangan, about 6 miles eastward of Kamaron, has an undulating summit, 859 feet (261^{m}8) high, thickly wooded in the eastern part. Koeremeh, 526 feet (160^{m}3) high, about 7 miles eastward of Sandangan, has a sharp upper edge with three pointed peaks; close westward of Koeremeh is a round hill with a couple of trees on its summit. Madah, 277 feet (84^{m}4) high, lies close to the coast 5 miles southward of Koeremeh, and has a bare summit; there are some round-topped trees

Charts 1066, 941b, 2759a.

To face page 133.



View, in two parts, of south coast of Madoera. East point of Kambing bearing 349°, distant 4 miles.
(Original dated 1931.)


Gili Radja.
High land W. of Ujong Tandjoeng.
Pongking.
Gili Pandan.
Tree on Gili Doea, bearing 078°, 4 miles.
Gili Gilingan (Lt. Ho. not shown.)

Wedi droogle.

Madoera, south coast. Western approach to Reede Boender.
(Original dated 1903.)

Chart 1653c.

on the north-western slope of this hill which are very noticeable from westward, but from other directions are obscured by the hill itself; a sloping, bare tree on the south-eastern slope of this hill is, however, noticeable from all directions. Bawa Sampang, near the coast 7 miles eastward of Madah, has a couple of large trees near the summit; between Madah and Bawa Sampang is the thickly wooded Taboeloe hill, which extends in an easterly direction behind Bawa Sampang. *See* view facing this page.

Charts 934, plan of Sapudi strait, 1653c.

The eastern part of the south coast of Madoera differs from the western portion both by the irregular contour of the coast and by the numerous off-lying islands and reefs. Two large bays are formed by Ujong Tandjoeng (Tanjung), the extremity of a promontory about midway between Tanjong Padelegan (*Lat. 7° 15′ S., Long. 113° 32′ E.*) and Tanjong Lapa, the eastern extremity of Madoera; the eastern of these is again divided into two smaller bays by Poeteran (Puteran) eiland, the western of these, named Baai van Soemenep, being the most important.

The land, on the whole, is comparatively high and thickly wooded, with the exception of the portions northward of Tanjong Padelegan and at the back of Baai van Soemenep, which are low and marshy. The most prominent mountains and hills are:

Chart 1653c.

Rompeng, Sekaran, and Tamboekoe (Tambuku), three summits, about equal distance apart, of a ridge running in an east and west direction about 13 miles northward of Tanjong Padelegan; at about 3 miles westward of Rompeng this ridge bends southward, and, gradually decreasing in elevation, turns back again eastward, and runs nearly parallel with its former direction at a distance of from 3 to 5 miles. Except for the three summits just mentioned, the greater part of the first ridge is obscured behind the second ridge. The highest peak of the former range is Tamboekoe, which has an elevation of 1,543 feet (470^{m}3) and that of the latter is Djambangan (Jambangan), a wooded mountain 1,110 feet (338^{m}3) high, about 3 miles south-westward of Tamboekoe. Eastward of Djambangan the ridge approaches nearer to the coast, and about 7 miles westward of Ujong Tandjoeng is Pongking, 730 feet (222^{m}5) high.

Coast.—The coast between Tanjong Goemong, a low, round, not very distinctive point, and Tanjong Batoe Poetih (Batu Putih), about 11 miles eastward, is fringed for the greater part by a rocky, drying bank which extends about half a mile offshore. The most noticeable village from seaward is Kadoengdoeng (Kadungdung), 4½ miles eastward of Tanjong Goemong. At Laboean village, 2¼ miles farther eastward, there is a very noticeable round-topped tree close to the beach.

Tanjong Batoe Poetih is a steep, rocky, wooded point, 40 feet (12^{m}2) high; the rocky ground is of a light colour, and the tops of the trees are elevated about 100 feet (30^{m}5). A steep-to sandspit which dries, extends 3 miles south-eastward from the point; outside this spit there are often dark brown patches caused by Baliga rivier, which flows out close eastward of the point and is only navigable for praus. Seleret (page 118) in line with the noticeable tree at Laboean, bearing 307°, leads south-westward of the above spit.

Charts 1066, 941b, 2759a.

Chart 1653c.

Off-lying island.—Measured distance.—Kambing, an island lying about 5 miles south-eastward of Tanjong Batoe Poetih, is well populated, chiefly by fishermen. A white stone triangulation pillar stands on the eastern extremity. The island is fringed by a coral reef which dries, extending nearly half a mile from the southern side, but only a short distance from the northern side. *See* also on page 120.

There is a measured distance northward of Kambing, marked by beacons erected on the eastern and western extremities of the island; the course is 098°, and the distance between the alignments of each pair of beacons is 2,427 yards (2,219^{m}2).

Reede Sampang.—Light.—Reede Sampang is bounded by lines drawn, respectively, in the directions 325° and 047°, to the coast, from the western and eastern extremities of Kambing.

Sampang, a shipping place for salt, about 7 miles eastward of Tanjong Batoe Poetih, is situated about one mile inland, on the banks of Kali Sampang; only the light-structure, and the Harbour office, a white house with a red roof situated close to the light-structure, are visible from seaward.

A light (*Lat. 7° 13′ S., Long. 113° 16′ E.*) is exhibited, at an elevation of 33 feet (10^{m}1), from a post, 33 feet (10^{m}1) in height, on the left bank, close inside the entrance to Kali Sampang.

Anchorage may be obtained, in depths of from 8 to 10 fathoms (14^{m}6 to 18^{m}3), mud, with the light-structure bearing 336°, distant about 1¾ miles; this anchorage is unserviceable in the east monsoon. At high water small craft can pass over the coastal bank into the river, which is navigable up to the town.

Coast.—The stone houses of Tandjoeng (Tanjung) village, about 8 miles eastward of Sampang, are the only noticeable landmarks between Sampang and Tanjong Padelegan, besides the hills previously mentioned.

Chart 3312.

Coast.—Tanjong Padelegan is low, sandy, and difficult to distinguish; a steep-to bank, with depths of less than 6 fathoms (11^{m}0) over it, extends about 2 miles from the point; the outer part consists of soft mud, and the inner part, which partly dries, is of hard sand. Kali Trokan (Padelegan) flows out close westward of the point.

Tanjong Dato, about 1¾ miles north-eastward of Tanjong Padelegan, is a wooded, rocky point A bank of mud, sand, and shells, with general depths of from 2 to 5 fathoms (3^{m}7 to 9^{m}1) over it, but with several rocky heads, extends about 7 miles eastward from Tanjong Dato; Gili Doea (Dua) lies near the eastern extremity of this bank.

Off-lying islands and dangers. — Light. — Buoys. — Beacons. —Takat Bloekoeran (Belukaran) and Takat Wedi (Rangkah), lying about 3½ miles east-north-eastward and 4½ miles eastward, respectively, of Tanjong Dato, are small islets of white coral sand each lying on a reef.

Charts 3312, 934, plan of Sapudi strait.

Gili Doea and Gili Pandan lie together on a reef nearly 7½ miles eastward of Tanjong Dato; they are barely 2 feet (0^{m}6) high and are covered with low bushes, but there is a round-topped tree on Gili Doea which is visible 6 miles. Gili Doea is marked by an iron beacon surmounted by a black rectangle.

Pasir Poetih (Gili Wutak), 1½ miles eastward of Gili Pandan, is only

Charts 3312, 934, plan of Sapudi strait.

about 2 feet ($0^{m}6$) high, but two trees on it can be seen at a distance of 6 miles; it is fringed by a reef, which dries, from one to 2 cables wide. There is a depth of 6 fathoms ($11^{m}0$) in the fairway of the channel between Pasir Poetih and Gili Pandan.

Gili Gilingan, about 1½ miles eastward of Pasir Poetih, is a wooded islet fringed by a reef. There is a depth of 6½ fathoms ($11^{m}9$) in the fairway of the channel between Gili Gilingan and Pasir Poetih.

A light is exhibited, at an elevation of 58 feet ($17^{m}7$), from a white beacon, 33 feet ($10^{m}1$) in height, near the western extremity of Gili Gilangan.

Goentoer rif (Guntur), about 1¾ miles south-south-eastward of Gili Gilingan, partly dries, and is plainly marked by discoloration; it is marked by an iron beacon surmounted by a black rectangle.

Gili Radja (Raja), the south-western extremity of which lies about 2¼ miles north-north-eastward of the light-structure on Gili Gilingan (*Lat. 7° 15′ S., Long. 113° 44′ E.*), is well wooded and fertile. The southern side rises steeply to an elevation of about 180 feet ($54^{m}9$); the northern side slopes down to low marshy land with a shelving coast. The island is fringed by a reef, narrow on the southern side, but extending from a half to nearly one mile from the eastern and northern sides, and about 4 cables from the western side.

An iron beacon, surmounted by a black screen, stands on the southern side of Gili Radja, and a beacon, surmounted by a diamond, stands on the ridge on the same side. A beacon, surmounted by a diamond painted in black and white horizontal bands, stands on the north-western extremity of the island, and a beacon, surmounted by a white triangle stands on the coast about 1½ miles farther eastward. A black beacon, surmounted by a cone, stands on the extremity of the reef extending nearly one mile from the eastern extremity of the island.

A rock, with a depth of 4 feet ($1^{m}2$) over it, lies half a mile off the middle of the north coast, and a 5-foot ($1^{m}5$) shoal lies about the same distance northward of the north-eastern extremity of the island. The channel between Gili Radja and Gili Gilingan is clear of dangers. Gili Radja is well populated, but only a few scattered huts are visible from seaward.

Chart 3312.

Anchorage.—During the east monsoon there is anchorage one mile westward of the northern extremity of Gili Pandan, in depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$), mud, sand, and shells. *See* view facing page 133.

Coast.—The coast between Tanjong Dato and Talang village, 6½ miles northward, is flat and marshy, with many fish-ponds; eastward of Talang village the coast becomes higher, and the land is wooded and fertile. Tanjong Loeboek (Lubuk), 13 miles eastward of Talang village, is low and wooded. Of the villages along the coast, Kadoeara (Kaduara), close north-eastward of Talang, may be identified by a tall banyan tree, showing up dark against the background; the houses of Pakamban village, about 2½ miles eastward of Kadoeara, are visible from seaward; Kapedi, 4½ miles eastward of Pakamban, has a white stone house on the beach.

The only river of any importance is Kali Boender (Bunder), which flows out about 2 miles northward of Tanjong Dato. The mouth of this river is about half a cable wide, with depths of from 2 to 3 fathoms

Charts 1653c, 1066, 941b, 2759a.

Chart 3312.

(3^{m}7 to 5^{m}5) up to the Harbour office, situated on the right bank about one mile up, but in the channel through the drying bank of mud and sand fronting it there is a depth of only one foot (0^{m}3); this channel is marked by unofficial beacons, and a white conical buoy is moored off the entrance. There is a road from the Harbour office to Pamekasan (chart 1653c), the capital of Madoera, situated about 5 miles inland.

Reede Boender.—Reede Boender (Bunder), north-eastward of Tanjong Dato, is seldom visited, but it affords safe anchorage in the west monsoon, and the holding ground, mud, is good; in the east monsoon there is considerable sea in the bay, which renders the anchorage off the mouth of Kali Boender unsafe. During the west monsoon vessels anchor east-north-eastward of the mouth of the river, as close in as their draught will allow; there is a depth of 4 fathoms (7^{m}8) about 3 miles offshore.

Vessels of light draught, approaching from southward or westward, can reach the anchorage by passing westward of Takat Bloekoeran; some drying parts on the bank on the western side of this channel are useful guides. Vessels of more than 16 feet (4^{m}9) draught should take the passage between Pasir Poetih and Gili Gilingan (*Lat.* 7° 15′ *S., Long.* 113° 44′ *E.*), or between the latter island and Gili Radja. *See* view facing page 133.

Chart 934, plan of Sapudi strait.

Coast.—Light.—Ujong Tandjoeng (Tanjung), the southern entrance point of Baai van Soemenep (page 137), is low, rocky, and wooded with large trees. About 1½ miles north-westward of the point is a prominent clump of trees on the slope of the hills; when seen from southward this clump appears as a wooded mass of stones, but from north-eastward it appears to consist of only two trees.

A light is exhibited, at an elevation of 56 feet (17^{m}1), from a white iron framework structure, 43 feet (13^{m}1) in height on Ujong Tandjoeng.

Poeteran (Puteran), an island, the south-western extremity of which lies about 4 miles north-eastward of Ujong Tandjoeng, is separated from Madoera by the narrow channel at Kalianget, and is traversed on its southern side by a range of hills attaining their highest elevation at Tjabia (Chabia), a hill, in the western part, and Modjopait (Mojopait) in the eastern part. The hills slope evenly to Tanjong Sarotak, the eastern extremity of the island, which has a round-topped tree on it. Tanjong Padike, the south-western extremity, can be readily identified at a short distance; a tongue of land, 10 feet (3^{m}0) high, projects here, and, on its rocky extremity is a large round-topped tree, giving the point the appearance of an islet when seen from eastward. The hills slope down gradually on the northern side of the island, which is low and marshy in places. The north coast forms the southern side of a large bay, which is, however, of little use for navigation as it is shoal, although small craft can reach Baai van Soemenep from it through the narrow strait at Kalianget.

Poeteran is fringed by a reef, which extends less than half a mile offshore, but off Tanjong Sarotak this reef is very narrow and steep-to, the depth at 2 cables from the point being 7 fathoms (12^{m}8). The principal village on the island is Talangoe (Talangu), a prosperous place with some stone houses, situated on the north-west coast; Poeteran is a smaller village near the north-eastern point.

Off-lying islands and dangers.—Light.—Gili Genteng (Genting),

Charts 1653c, 1066, 941b, 2759a.

Chart 934, plan of Sapudi strait.

the northern extremity of which lies about 3 miles south-south-eastward of Ujong Tandjoeng, consists of two masses of moderately high land connected by a low, narrow neck, and has the appearance of two islands from a distance; the south-eastern part, named Koeripan (Kuripan), has a steep, rocky coast. The whole island is fringed by a reef which dries, well marked by discoloration; a sandbank, with a least depth of 4$\frac{3}{4}$ fathoms ($8^{m}7$) over it, extends nearly 2$\frac{1}{2}$ miles eastward from the northern extremity. Gili Genteng is well populated; the principal village, Aeng Anjar, is on the northern side.

A light (*Lat. 7° 12′ S., Long. 113° 53′ E.*) is exhibited, at an elevation of 36 feet ($11^{m}0$), from a white iron framework structure, 26 feet ($7^{m}9$) in height, on the coastal reef extending about 2 cables from the western side of Gili Genteng.

Noko droogte, 1$\frac{1}{4}$ miles north-north-westward of the northern extremity of Gili Genteng, is a patch of white coral sand on the northern part of a reef which dries; it is steep-to on all sides except the western, where a sandbank, with a least depth of 3$\frac{1}{4}$ fathoms ($5^{m}9$) over it, extends three-quarters of a mile westward.

Gemer rif, one mile east-north-eastward of the northern extremity of Gili Genteng, is a coral reef which dries, well marked by discoloration. Between this reef and the point there is a passage with a least depth of 4$\frac{3}{4}$ fathoms ($8^{m}7$) in the fairway.

Van den Berg rif (Berg rock), 2$\frac{1}{2}$ miles east-north-eastward of the south-eastern extremity of Gili Genteng, is a steep-to coral patch with a depth of 1$\frac{1}{2}$ fathoms ($2^{m}7$) over it. The passage between this reef and Gili Genteng is clear of dangers. Kokop riffen, about 1$\frac{1}{4}$ miles eastward of Van den Berg rif, are two steep-to coral reefs, which dry.

Gili Lawak, 1$\frac{1}{4}$ miles eastward of Kokop riffen, is a low islet covered with brushwood and fringed by a reef which dries; a tree, 72 feet ($21^{m}9$) high, stands near the southern extremity.

Chart 934, plans of Sumenep bay and Sapudi strait.

Baai van Soemenep.—Baai van Soemenep (Sumenep), entered between Ujong Tandjoeng and Tanjong Padike, on the south-western side of Poeteran, is nearly filled with a bank of soft mud; the depth just within the entrance points is 18 feet ($5^{m}5$), and it shoals gradually towards Kalianget, with a least depth of 8 feet ($2^{m}4$) on the leading line.

Two rivers discharge into the bay: Kali Saroka, on the western side of the bay, is formed by the confluence of two streams about one mile above the mouth; the depths within this river are from one to 2 fathoms ($1^{m}8$ to $3^{m}7$), but on the bar at the entrance the depth is only from 2 to 3 feet ($0^{m}6$ to $0^{m}9$). There are several salt warehouses on the right bank, near the mouth, and on the opposite bank is Saroka village. Kali Marengan rises near Soemenep (Sumenep) town, about 4 miles inland, and flows out in the northern part of the bay, but the channel is lost in the mudbank fronting the shore; the Customs and Harbour offices are situated on the right bank of this river. The shore between these two rivers is low, marshy, and consists mainly of salt-pans, from which the principal export of the place is derived.

Soemenep, the capital of the district and residence of the Government official, is connected to the lower town, named Marengan, where most of the Europeans live, by a long row of houses built along the banks of Kali Marengan. An old fort, now used as a native hospital, lies about

Charts 1653c, 1066, 941b, 2759a.

Chart 934, plans of Sumenep bay and Sapudi strait.

half a mile eastward of Marengan, and its red roofs are visible from the outer roadstead.

Chart 934, plan of Sumenap bay.

Reede Kalianget.—Lights.—Reede Kalianget comprises Baai van Soemenep and the area southward enclosed by the northern coast of Gili Genteng and lines drawn from the north-eastern and north-western extremities of that island to Tanjong Padike (*Lat. 7° 05′ S., Long. 113° 57′ E.*) and Ujong Tandjoeng, respectively.

Kalianget is the shipping port of Soemenep, and is connected to it by a steam tram and a road. About three-quarters of a mile north-westward of Kalianget is a large salt factory; in the evenings, and sometimes throughout the night, its electric lights may be seen far out at sea. A curved pier, with a depth of 8 feet (2^{m}4) at its head, extends from the shore near the factory; there is also a pontoon pier in the narrows at Kalianget.

Leading lights are shown at Kalianget. The front light is exhibited, at an elevation of 30 feet (9^{m}1), from a white iron framework structure, 26 feet (7^{m}9) in height, situated on the beach about 1½ cables eastward of the root of the curved pier; the rear light is exhibited, at an elevation of 56 feet (17^{m}1), from a white iron framework structure, 43 feet (13^{m}1) in height, situated about three-quarters of a cable north-north-eastward of the front light. These lights in line, bearing 029°, lead to the channel between Kalianget and Poeteran from a position about 1¾ miles west-south-westward of Tanjong Padike.

Beacon.—Tide-gauge.—There is a white beacon, surmounted by a ball, on the eastern side of the channel, about 7½ cables southward of the front leading light-structure. There is a tide-gauge, giving the depths on the bar, on the inner side of the pontoon pier at Kalianget, about three-quarters of a cable outside the outer unofficial beacons.

Tidal streams.—Signals.—In the narrow channel off Kalianget the tidal streams set north-eastward and south-westward at a rate of 4 knots at full and new moon. In the entrance to Baai van Soemenep the streams are weak and the direction is much influenced by the winds.

The following tidal stream signals, coloured black, are displayed at Kalianget:—

A cone, point up, over a cylinder .	In-going stream.
Two cones, vertically disposed, over a cylinder	Strong in-going stream.
A cylinder, with a cone, point up, above it, and a cone, point down, below it	Slack water.
A cylinder over a cone, point down .	Out-going stream.
A cylinder over two cones, point down, vertically disposed	Strong out-going stream.

Chart 934, plans of Sumenep bay and Sapudi strait.

Anchorages.—Small vessels may obtain good anchorage during the west monsoon, in a depth of 3¾ fathoms (6^{m}9), mud, with Ujong Tandjoeng light-structure bearing 236°, distant 7½ cables, or, in a depth of 2¾ fathoms (5^{m}0), mud, with the same light-structure bearing 191°, distant 2 miles If there is too much sea at the former anchorage vessels can anchor about one mile south-south-eastward of Gemer rif. In the east monsoon anchorage may be obtained, in depths of from

Chart 934, plans of Sumenep bay and Sapudi strait.
6 to 7 fathoms (11^{m}0 to 12^{m}8), mud, northward of Aeng Anjar village, on the northern side of Gili Genteng, about 4 cables offshore.

Vessels of light draught go inside the bay and proceed alongside one of the piers, or moor at the two mooring buoys off Kalianget; it is inadvisable to anchor here on account of the confined space, shelving bottom, and strong tidal streams.

A vessel with a draught of 10 feet (3^{m}0) can reach Kalianget at low water.

Directions.—A vessel approaching Baai van Soemenep from westward or south-westward should use the channel known as the South-western channel, which leads southward of Gili Gilingan, passing on either side of Goentoer rif, and thence westward and northward of Gili Genteng; the western side of the channel between Gili Radja and Gili Genteng is marked by a beacon on the reef extending eastward from Gili Radja, and the eastern side by the light-structure on the reef extending from the western side of Gili Genteng (*Lat. 7° 12′ S., Long. 113° 55′ E.*).

A vessel from southward or south-eastward should use the channel known as the South-eastern channel to Soemenep, which leads between Gili Genteng and Van den Berg rif, and thence eastward of Gemer rif, or between this reef and Gili Genteng; the prominent clump of trees north-westward of Ujong Tandjoeng in line with the north-eastern side of the sand patch on Noko droogte, bearing about 312°, leads through the latter passage. From south-eastward, the vessel can pass north-eastward of Gili Lawak, and thence southward of Poeteran; the south coast of the latter island is fairly steep-to.

From the Java sea, the usual route is through Straat Sapoedi (*see* below) and thence southward of Poeteran; the channel between Gili Jang (page 140) and Madoera (*see* below) may also be used.

Harbour facilities.—Provisions are always obtainable; water is laid on to the pontoon pier. In case of urgent necessity coal may be obtained from the Government salt establishment. There is a slipway.

There is frequent steamboat service to Panaroekan; vessels of the Koninklijke Paketvaart Maatschappij visit the roadstead regularly. Kalianget is connected by steam tram with Soemenep, and thence with Kamal (page 113).

Charts 934, plan of Sapudi strait, 941b.
STRAAT SAPOEDI.—Light.—Island and dangers.—Beacon.—Straat Sapoedi (Sapudi), the channel between Gili Jang (Giliang) and Sapoedi eiland, 7½ miles south-eastward, is used regularly by vessels proceeding between Panaroekan and Bandjermasin (page 375), on the south coast of Borneo; it is also frequently used at night by vessels proceeding from Singapore to Australia, and *vice versa*, the track then continuing southward of the Kangean eilanden, through the Flores sea, and thence through Straat Wètar (chart 942a). *See* view facing page 142.

There is a swept channel eastward of Sapoedi, clear for all classes of vessels, and one westward of the island for demagnetized vessels only.

Charts 934, plan of Sapudi strait, 1653c.
Sapoedi, the largest of the Sapoedi eilanden (*see* page 145 for the remainder of this group), is wooded. A circular ridge of hills encloses

Charts 1653c, 1066, 941b, 2759a, 1263.

Charts 934, plan of Sapudi strait, 1653c.

the low interior part of the island at a short distance within the coast, the summit, 406 feet (123^{m}7) high, being on the eastern side. The island is fringed by a steep-to reef, which extends only a short distance offshore. Sapoedi is densely populated, Gajam (Gayam), on the south-western coast, being the principal village.

There is a stone pier, with a flagstaff at Gajam and a noticeable red-roofed cupola on the head, and a stone warehouse at the root; southward of this pier is a passage for praus through the coastal reef. A beacon surmounted by a ball marks a rock which dries, lying about one cable southward of the pierhead. Fresh provisions can be obtained in small quantities. Nonggoenoeng (Nongunung) village, on the north-east coast of Sapoedi, contains some stone houses.

A light (*Lat. 7° 05′ S., Long. 114° 17′ E.*) is exhibited, at an elevation of 190 feet (57^{m}9), from a white octagonal framework tower, 192 feet (58^{m}5) in height, on the western extremity of Sapoedi.

Chart 934, plan of Sapudi strait.

Tanjong Lapa, the eastern extremity of Madoera, is a low promontory covered with coconut trees; Lapa hill, 266 feet (81^{m}1) high, lies 2 miles west-north-westward of the point; it is isolated and is prominent from northward or southward. A reef, with some rocks awash on it, extends one mile eastward from the point, and a ridge of sand, with a least depth of 1½ fathoms (2^{m}7) over it, runs parallel with the coast, and at a distance of about one mile from it, for about 2½ miles from a position 1¼ miles north-eastward of the point; the coast here should not be approached within 2 miles.

Gili Jang, 2½ miles eastward of Tanjong Lapa, is a rocky island, from about 100 to 130 feet (30^{m}5 to 39^{m}6) high, with steep cliffs on its eastern side; there is a noticeable clump of trees in the middle of the northern part.

Straat Gili Jang, between Gili Jang and Tanjong Lapa, is of little importance to general navigation. A rock, with a depth of 23 feet (7^{m}0) over it, lies in the middle of the strait, and a 29-foot (8^{m}8) patch lies about one mile north-north-eastward of the rock; these dangers may be avoided by keeping within half a mile of the Gili Jang shore.

Tembaga riffen, about 7½ miles westward of Sapoedi eiland lighthouse, comprise a group of three reefs; the westernmost reef dries throughout, the northern dries in parts, and the southern has a depth of 2 feet (0^{m}6) over it. There is a clear channel, with depths of from 6 to 9 fathoms (11^{m}0 to 16^{m}5), between these reefs and Poeteran.

Jacoba Elizabeth rock lies about 4½ miles southward of Gili Jang, and is a steep-to coral rock with a least depth of 39 feet (11^{m}9) over it.

Anchorages.—During the west monsoon there is anchorage off Gajam village, in a depth of about 19 fathoms (34^{m}7), mud, about 4 cables from the drying coastal reef, with the prominent trees on a hill, 315 feet (96^{m}0) high, northward of the village, in line with the cupola on the pier, bearing 000°. This anchorage is not recommended in the east monsoon, and vessels should proceed to Triboeng (Tribung), at the western extremity of the island.

During the east monsoon there is anchorage off Triboeng, in depths of from 16 to 18 fathoms (29^{m}3 to 32^{m}9), about 2 cables from the drying coastal reef, with the lighthouse bearing 090°; there are some rocks close offshore. In the west monsoon this anchorage is not recommended, and vessels should proceed to Gajam.

Charts 1653c, 1066, 941b, 2759a, 1263.

Chart 934, plan of Sapudi strait.

Both these anchorages are unsuitable for a prolonged stay; when the monsoon current and tidal stream coincide, eddies and whirlpools may cause a foul anchor.

Currents and tidal streams.—The horizontal movement of the water in Straat Sapoedi is a mixture of monsoon current and tidal stream. There is no regular connection between the changes in the horizontal and vertical movements of the water, but, generally speaking, the flood tidal stream appears to set southward, and the ebb stream northward. During the east monsoon the monsoon current sets northward, and in the west monsoon southward. When the tidal stream and monsoon current are working together the rate is 2 knots.

Chart 1653c.

NORTHERN SIDE OF MADOERA.—Aspect.—The north coast of Madoera is quite clear, and can be safely approached everywhere except off Tanjong Lapa (*Lat. 6° 59′ S., Long. 114° 07′ E.*), the eastern extremity of the island. The depths increase gradually seaward; there is good holding ground throughout, the bottom consisting of mud, and mud mixed with sand inside the 5-fathom ($9^{m}1$) line. There are several patches of rocks close under the coast, rendering landing difficult, but at high water the coast is accessible anywhere.

The north coast of Madoera is hilly along its entire length, a range running parallel with the coast about 3 miles inland, and gradually increasing in elevation eastward; the higher land farther inland is seldom visible, but in clear weather the high mountains in the eastern part of Java are occasionally seen over Madoera.

The most noticeable hills along the north coast of Madoera are the following:—

Sordjan (Sorjan), 6 miles eastward of Tanjong Modoeng (Modung), the north-western extremity of Madoera, is 352 feet ($107^{m}3$) high, and surrounded by low, flat land. Tegiring, close eastward of Sordjan, consists of three hills, the western having a rounded summit, 349 feet ($106^{m}4$) high, and the eastern being more conical. Bangsereh, 663 feet ($202^{m}1$) high, lies about 3 miles east-south-eastward of Sordjan, and is very prominent, especially from close offshore eastward. About 4½ miles eastward of Bangserah is the Piek, 479 feet ($146^{m}0$) high, a prominent conical peak between two higher hills. Beroekoeng (Berukung), 749 feet ($222^{m}3$) high, lies about 3½ miles eastward of the Piek, and is one of the most prominent hills on this part of the coast, as there is a clump of high trees on its otherwise bare summit. Batoe Poetih (Batu Putih), nearly 5 miles eastward of Beroekoeng, is a conical hill, 625 feet ($190^{m}5$) high, with a deep cleft on its eastern side; on its summit are four small detached woods, which, when seen from westward, appear as two trees with thick foliage.

Koembang (Kumbang), about 13 miles eastward of Batoe Poetih, is a densely wooded hill, 884 feet ($269^{m}4$) high, with a flat summit. Waroe (Waru), about 9 miles eastward of Koembang, is a table mountain. Merangan about the same distance eastward of Waroe, is 1,304 feet ($397^{m}4$) high, and is the highest summit on the north coast. Podjok (Pojok), 5 miles eastward of Merangan, appears as a small conical peak from westward, but is difficult to distinguish from eastward. Boeroean (Buruan), nearly 10 miles eastward of Podjok, is an isolated hill, 969 feet ($295^{m}3$) high, with a slightly jagged summit.

Charts 1066, 941b, 2759a, 1263.

Chart 1653c.

Coast.—Tanjong Boeloe Pandan, 1½ miles north-eastward of Tanjong Modoeng, is flat and covered with low shrubs, but can be easily identified by a large tree standing about 3½ cables east-north-eastward of the point; there is a small bay, which mostly dries, between Tanjong Modoeng and Tanjong Boeloe Pandan. Sapoeloe (Sapulu) village, 6½ miles eastward of Tanjong Boeloe Pandan, has a small dark wood just westward of the houses. From here to Ketapang Daja (Daya) village, about 19 miles eastward, is a narrow strip of cultivated land in front of the ridge of coastal hills; Ketapang Daja is very noticeable from seaward, and close eastward of the village a waterfall descends from a height of 35 feet ($10^{m}7$). Proceeding eastward the coast becomes more rocky, and slopes up gradually to a low ridge of hills.

Pasongsongan village, 22 miles eastward of Ketapang Daja (*Lat. 6° 53′ S., Long. 113° 17′ E.*), may be identified by a prominent dark red building. Amboenten (Ambunten), about 27 miles eastward of Ketapang Daja, is noticeable owing to its stone houses and the lower, cultivated land around it. Between Amboenten and Sergang village, 7½ miles eastward, are seven low patches of sand in the coast, much resembling sand dunes.

Chart 1066, plan of Bawean eiland.

BAWEAN.—Bawean, an island, 62 miles northward of Tanjong Modoeng, is densely wooded and mountainous, rising near the centre of the island to an elevation of 2,150 feet ($655^{m}3$); portions of the south and north-west coasts are low, elsewhere the mountain ridges run down to the sea. The island is surrounded by dangerous reefs, especially off the eastern side, where they extend to a distance of 9 miles with considerable depths between them, rendering the approach on this side very dangerous. *See* views facing this page.

The inhabitants are mainly seafaring; there is little agriculture, but a certain amount of weaving of garments and mats is carried on. Periodically large numbers of the people proceed to Java and Singapore as labourers for the season.

Currents.—The horizontal movement of the water around Bawean is almost entirely due to the monsoons. No greater rate than 2 knots has been observed.

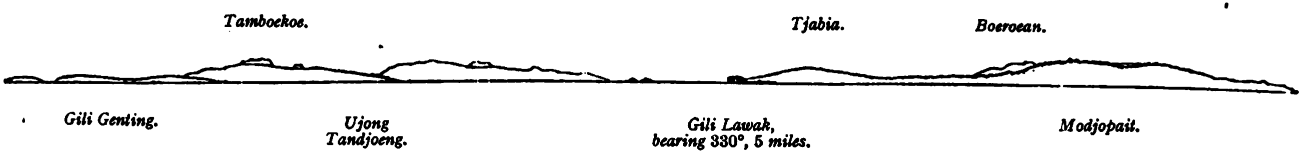
Chart 932, plan of Sankapura bay, and plan of Bawean eiland on chart 1066.

Reede Sangkapoera.—Light — Dangers. — Beacons. —Reede Sangkapoera (Sankapura) is bounded by the parallel of Tanjong Alang Alang (Cape Alang), the southern extremity of Bawean, and the meridian of Tanjong Lajar (Layar), nearly 4 miles eastward, and the coast between them.

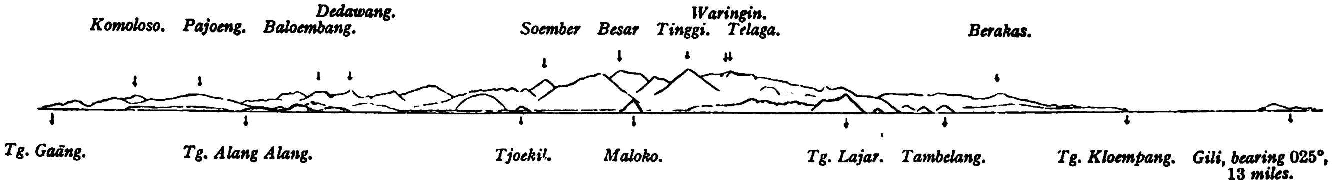
Tanjong Alang Alang is the extremity of a peninsula with a hill on it, 230 feet ($70^{m}1$) high, which appears as an islet from a distance; the coastal reef extends 3 cables from the point, and has some large rocks on it. Tanjong Lajar (*Lat. 5° 52′ S., Long. 112° 41′ E.*) is the extremity of a peninsula, 600 feet ($182^{m}9$) high, connected to the main island by a low, narrow isthmus; on the south-eastern side of the peninsula, and connected to it by a low barren ridge, is a high, salient point, named Tanjong Moemoeni (Mumuni), which appears as an islet. Noko, an islet, three-quarters of a mile eastward of Tanjong Moemoeni, is

Charts 1653b, 941b, 2759a, 1263.

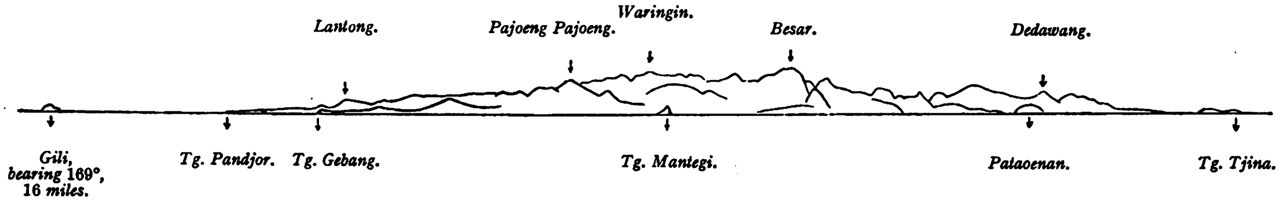
To face page 142.



Straat Sapoedi, southern entrance.
(Original dated 1947.)

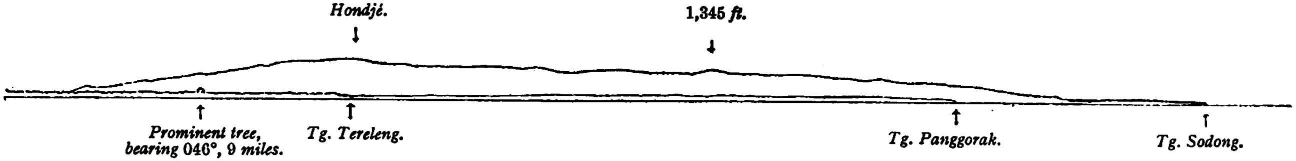


Bawean eiland from southward.
(Original dated 1931.)


Lantong.
Pajoeng Pajoeng.
Waringin.
Besar.
Dedawang.
Gili, bearing 169°, 16 miles.
Tg. Pandjor.
Tg. Gebang.
Tg. Mantegi.
Pataoenan.
Tg. Tjina.

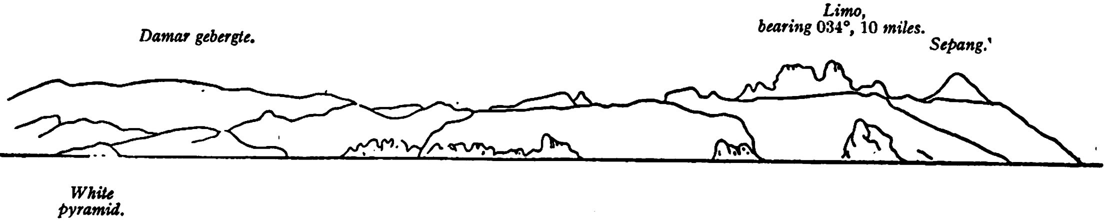
Bawean eiland from northward.
(Original dated 1931.)

To face page 143.



Java, south coast between Tanjong Tereleng and Tanjong Sodong.

(*Original dated* 1929.)



Java, south coast. Approach to Patjitan baai.

(*Original dated* 1947.)

Chart 932, plan of Sankapura bay, and plan of Bawean eiland on chart 1066.

low, covered with brushwood, and fringed by a reef which extends from 2 to 3 cables offshore; a detached reef, with a least depth of 3 fathoms (5^m5) over it, lies about 4 cables south-westward of Noko. The shoal patches lying in the vicinity of the parallel of 5° 55′ S. are sometimes marked by discoloration.

A stone pier extends south-south-westward from the town to just outside the edge of the coastal reef, with the harbour office and a flagstaff close to its root. A mole extends in a north-easterly and south-westerly direction on the reef, which dries, lying close north-westward of Tengah besar (Great Tenga reef), which is a reef, which dries, lying with its outer edge about half a mile from the head of the pier. Maloko (*Lat. 5° 51′ S., Long. 112° 39′ E.*), a conical hill about three-quarters of a mile northward of the pier, is prominent.

A light is exhibited, at an elevation of 47 feet (14^m3), from the flagstaff at the root of Sangkapoera pier.

Two leading beacons, each consisting of a white framework post, stand on the western side of the town; the front beacon is situated on the beach one mile west-north-westward of the light-structure, and the rear beacon on the summit of Tjoekil, a hill, 6¾ cables northward of the front beacon.

Numerous reefs, the positions of which may best be seen on the chart, lie in the roadstead and some are marked by beacons, the only official one being a beacon, which marks Kolong reef, lying on the eastern side of the leading line, 6½ cables south-south-eastward of the front leading beacon.

Anchorages.—Good anchorage may be obtained by large vessels, in depths of from 12 to 14 fathoms (21^m9 to 25^m6), with the flagstaff bearing between 000° and 027°, and the highest part of Tanjong Lajar not more than 090°. Small vessels can anchor within the reef by keeping the leading beacons in line bearing 359°, and anchoring when the flagstaff bears about 072°. Continuous south-easterly and south-westerly winds soon raise a heavy swell in the roadstead, and also with winds between west and north-west, a swell sets in.

Sangkapoera.—Sangkapoera, the residence of a Government official, is situated a short distance inland, on the banks of a small stream flowing into the bay. The Government official's house, a large building, is situated near the beach on the eastern side of the stream, and close to it is the post office and a large warehouse. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and there is a brisk native seaborne trade.

Chart 1066, plan of Bawean eiland.

Western and northern coasts.—Dangers.—Tanjong Gaäng, the south-western extremity of Bawean, is a bare, rocky tongue of land. Tanjong Gili, about 2¼ miles northward of Tanjong Gaäng, is 152 feet (46^m3) high, densely wooded and very prominent. Tanjong Doengos and Tanjong Tjina, about one and 2¼ miles, respectively, northward of Tanjong Gili, are similar to that point. Bangsal baai, entered between Tanjong Gili and Tanjong Doengos, affords good anchorage in the east monsoon to vessels with local knowledge. The coast between Tanjong Gaäng and Tanjong Gili is foul to a distance of about half a mile offshore and between Tanjong Gili and Tanjong Tjina to a distance of about one mile.

Charts 1653b, 941b, 2759a, 1263.

Chart 1066, plan of Bawean eiland.

Two shoals, with depths of 39 and 15 feet (11^{m}9 and 4^{m}6) over them, lie about 3 miles south-westward and 4¾ miles west-south-westward, respectively, of Tanjong Alang Alang (*Lat. 5° 52′ S., Long. 112° 37′ E.*). A shoal, with a depth of 39 feet (11^{m}9) over it, lies 2½ miles south-westward of Tanjong Gili. Karang Simalang and Karang Djambang, each with a depth of less than 6 feet (1^{m}8) over it, lie about 7 cables south-westward and one mile north-westward, respectively, of Tanjong Gili.

Noesa, a high, bare rock, lies 2½ miles north-westward of Tanjong Tjina. Foul ground extends about 1½ miles southward and one mile northward from Noesa, and a 16-foot (4^{m}9) patch lies nearly 2 miles west-north-westward of the same islet. Bila, a wooded islet, 155 feet (47^{m}2) high, lies on the reef extending from the north-western side of Bawean, about 2 miles north-north-eastward of Tanjong Tjina. Several shoals lie between Bila and Noesa; this area should be avoided, although the shoals are usually visible in the clear water from a short distance.

Tanjong Mantegi, the northern extremity of Bawean, is 321 feet (97^{m}8) high; Batu Kebo, half a mile eastward of the point, consists of a group of rocks above water. Promahan baai, westward of Tanjong Mantegi, affords good anchorage for vessels with local knowledge, in depths of from 8 to 11 fathoms (14^{m}6 to 20^{m}1), but care should be taken to avoid a 2½-fathom (4^{m}6) reef lying 1½ miles westward of Tanjong Mantegi, and nearly in the middle of the entrance to the bay; about 3 cables south-westward of this reef is a coral patch with a depth of 3 feet (0^{m}9) over it. Tambak village is built on piles at the mouth of a stream on the western side of the bay. Tanjong Gebang, the north-eastern extremity of Bawean, is wooded.

Eastern coast.—Off-lying islets and dangers.—The eastern coast of Bawean is of no importance for general navigation, and should be avoided on account of the numerous off-lying reefs. Most of the drying reefs are plainly marked by discoloration when covered; shoal patches can usually be seen in the clear water, although not until the vessel is almost over them.

Gili, nearly 2 miles east-south-eastward of Tanjong Pandjor, the eastern extremity of Bawean, is a thickly wooded islet, 342 feet (104^{m}2) high in the northern part; Manoekan, off the south-eastern extremity of Gili, is a small rock covered with vegetation; Gili Noko, about half a mile southward of Gili, is a low, bare islet. The above three islets stand on an extensive reef which dries; the channel between them and the reef extending off the east coast of the main island is foul.

Karang Tambaga and Karang Gosong are two detached reefs, the latter of which is always covered, lying about 2 and 4½ miles, respectively, north-eastward of Gili; a wreck on the north-eastern side of Karang Gosong can usually be seen from a distance of 4 miles. A reef, with a least depth of 1¼ fathoms (2^{m}3) over it, lies about 1½ miles northward of Karang Gosong, and is the north-easternmost of the dangers eastward of Bawean.

Karang Berapat, 3½ miles east-south-eastward of Gili, just covers.

Karang Boengarang, 4 miles east-south-eastward of Tanjong Kloempang, the south-eastern extremity of Bawean, is an extensive reef with a patch, which dries, on it. There are several shoal patches

Chart 1066, plan of Bawean eiland.

between Karang Boengarang and Karang Tambaga and also between Karang Boengarang and Noko. A 29-foot ($8^{m}8$) patch lies about 2¼ miles south-westward of the drying patch of Karang Boengarang. Bitian, a shoal with a depth of 19 feet ($5^{m}8$) over it, lies about 4¾ miles eastward of Karang Boengarang (*Lat. 5° 52′ S., Long. 112° 47′ E.*), and is the easternmost danger off Bawean.

Chart 1066.

Outlying reef and bank.—Annie Florence reef, 48 miles north-eastward of Bawean, was discovered by the master of the *Annie Florence,* in 1879; it is only about a quarter of a cable in extent, dries in places and is steep-to; it is only slightly marked by discoloration, but sometimes breaks. In clear weather Bawean can be seen from the reef.

A bank, with a depth of 52 feet ($15^{m}8$) over it, lies 9½ miles east-north-eastward of Annie Florence reef.

Chart 1653c.

SAPOEDI EILANDEN.—Sapoedi (Sapudi) eilanden, lying off the eastern end of Madoera, consist of 13 islands, the principal being Sapoedi (described on page 139), Raäs, Boeloemanoek (Bulumanuk), Pajangan (Payangan), Toendoe (Tundu), Goa Goa, and Kamoedi (Kamudi). Except Sapoedi and Raäs, all the islands are flat and low. Sapoedi, Boeloemanoek, Raäs, Toendoe and Goa Goa are inhabited; on the remainder are only temporary settlements. A brisk trade is carried on by the natives in praus, principally at the beginning and end of the east monsoon.

Pajangan, 7½ miles north-eastward of the northern extremity of Sapoedi, and Boeloemanoek, about 3 miles east-south-eastward of Pajangan, have no noticeable features; each is fringed by a reef.

Raäs, 4 miles eastward of the south-eastern extremity of Sapoedi, is hilly in the eastern and western parts and low in the middle; at a distance of 10 miles this low part dips below the horizon, giving Raäs the appearance of two islands. A reef, which partly dries, extends 4½ miles from the northern side of the island; Sarok, a moderately high, wooded islet surrounded by a white sandy beach, lies on the northern part of this reef and is a good landmark. On the north-western side of the reef are some detached patches; Koset rif, with a depth of 11 feet ($3^{m}4$) over it, lies 5½ miles westward of Sarok and about 2½ miles eastward of the western edge of the reef, and is nearly always marked by discoloration; Reiger rif, with a depth of 23 feet ($7^{m}0$) over it, lies 2½ miles north-westward of Sarok and about 1¼ miles from the western edge of the reef, and is not marked by discoloration. The small, high islet Anjer, covered with vegetation, lies about half a mile off the north-eastern extremity of Raäs, and is very noticeable when seen from a favourable position.

Toendoe, about 2¼ miles eastward of Raäs, has a hill, 97 feet ($29^{m}6$) high, with a flat summit on it; there is a narrow channel, only navigable for small vessels with local knowledge, between the reefs extending from Toendoe and Raäs.

Telango Ajer, Telango Tengah, and Telango Timoer (Timur) are a chain of low, uninhabited islands, fringed by reefs and with narrow, deep channels between them, lying northward of Toendoe. Telango

Charts 1066, 941b, 2759a.

Chart 1653c.

Ajer and Telango Timoer (*Lat. 7° 06′ S., Long. 114° 42′ E.*) are covered with low brushwood.

Goa Goa lies on the south-eastern end of an extensive reef 4 miles east-north-eastward of Toendoe. The north-eastern half of the island is high, and has some noticeable trees on it; the south-western part is low. There are usually numerous trading praus lying in the bight on the north-west coast of this island. Kamoedi, about one mile north-north-eastward of Goa Goa, and separated from the reef westward of it by a narrow channel, is encircled by a white sandy beach and is cultivated.

Channels.—Straat Raäs, between Sapoedi and Raäs, is clear of dangers and deep, but is seldom used.

The channel between Boeloemanoek, on the northern side, and Koset and Reiger riffen, on the southern side, is clear of dangers, deep, and easy to navigate.

The channel between the reefs extending from Raäs and Toendoe, on the south-western side, and Telango Ajer, Telango Tengah, Telango Timoer, and Goa Goa, on the north-eastern side, is clear of dangers and deep except for a 46-foot ($14^{m}0$) patch about 1¾ miles south-westward of Goa Goa.

KANGEAN EILANDEN.—Kangean eilanden, eastward of Sapoedi eilanden, consist of one large island and several smaller ones, with numerous islets and reefs around and between them. Like the Sapoedi eilanden, they are only important to general navigation as landmarks; vessels on the Singapore-Australia route pass westward and southward of the Kangean eilanden by day, and vessels proceeding between Straat Madoera and Macassar strait pass southward and eastward of them.

The inhabitants are very mixed, with Malays on the coasts. They have large herds of cattle, and are agriculturists and fishermen; on Kangean and Sepeken there is particularly brisk trade.

Tidal streams.—The tidal streams may be very strong in the channels between the islands and westward of the group. Strong tide-rips occur between the south-western side of Kangean and Karang Takat and during the east monsoon a heavy sea may be experienced. In the open sea in the vicinity of the islands the rate seldom exceeds one knot.

Islet and dangers westward of Kangean.—Karang Takat or Takat Noko, midway between Kamoedi and the western end of Kangean, is an extensive reef which dries; when covered it is plainly marked by discoloration, and can also be identified by the fishing praus usually seen there, and sometimes by temporary shelters built on piles.

The channels eastward and westward of Karang Takat can be safely taken in the daytime.

A shoal, with a depth of 3 fathoms ($5^{m}5$) over it, was reported, in 1946, to lie about one mile westward of the western extremity of Karang Takat.

Kemirian or Urk (*Lat. 7° 05′ S., Long. 115° 12′ E.*), the south-western islet of the Kangean group, and 7¾ miles eastward of the eastern extremity of Karang Takat, is low, but is wooded with trees having an elevation of 154 feet ($46^{m}9$); it is fringed by a steep-to coral reef,

Charts 1066, 941b, 2759a, 1263.

Chart 1653c.

and is inhabited. The channel on either side of Kemirian is safe and deep.

Kangean.—Kangean, the largest of the Kangean eilanden, consists of coral lime, heaved up by volcanic action, and there are some very beautiful stalactite grottos, one of which, near Ketapang, is 5 miles deep. The island is wooded throughout, and there are no rivers or lakes, fresh water being obtained from wells. A ridge of hills traverses the greater part of the northern side of the island, and, separated from this main ridge by a low plain, a detached group of hills rises near the north-western extremity of the island; the most prominent summits of the latter group are West hill, 440 feet ($134^{m}1$) high, and Soemoer Batoe, 394 feet ($120^{m}1$) high.

The western part of the island is the most populated and cultivated. A Government official resides at Ardjasa, in the north-western part. Other places of importance are Kalisangka, with Ketapang close to it, in Ketapang baai on the west coast, and the flourishing fishing village Pabean, on the north coast; the latter village can be easily identified by a thick coconut wood, and a number of praus lying in an inlet in the coastal reef. Owing to the numerous reefs, it is inadvisable to navigate along the northern side of Kangean eastward of Pabean village.

The south coast of Kangean is somewhat low, and is indented with many bays and inlets, all greatly obstructed by islets and reefs; Hekla baai and Gedeh baai, in the western part, are of no importance.

Chart 934, plan of Ketapang bay.

Ketapang baai.—Dangers.—Beacons.—Ketapang baai, on the west coast of Kangean, is entered between Mamboerit (*see* below) and Tanjong Batoe (Batu) Teteh, about 2¾ miles south-south-westward, and is the only anchorage of any importance. The northern side of the bay is formed by a hilly promontory terminating in Tanjong Batoe Goeloek (Batu Guluk). Soemoer Batoe, mentioned above, and nearly 2 miles eastward of Mamboerit, is the most conspicuous peak near this promontory, and affords a good mark for entering the bay.

Mamboerit (Mamburit) is a fairly high islet with a white sandy beach, and is separated from Tanjong Batoe Goeloek by Bromo passage; it lies on the eastern side of an extensive reef which partly dries, and a flat, with depths of less than 5 fathoms ($9^{m}1$) over it, extends 2 miles south-westward.

The shore of the bay is fringed by a broad reef which dries, and there are several detached reefs. In the north-eastern part of the bay are Takat Takat and Takat Loear (Luar), reefs which dry, between which there is a narrow channel, with a least depth of 4 feet ($1^{m}2$) in it, marked by two unofficial stake beacons, giving access to the landing pier at Kalisangka village, whence a road leads to Ardjasa, 2 miles eastward. A beacon, surmounted by a white ball, stands on the western edge of Takat Takat reef, about 1½ miles south-eastward of Mamboerit.

A beacon, surmounted by a white ball, stands on the northern extremity of the northern Takat Patokanan, about 6 cables south-eastward of Mamboerit. A beacon, surmounted by a white cone, stands on the western edge of the southern Takat Patokanan. A beacon, surmounted by a white ball, stands on the northern edge of the coastal reef, about 7 cables northward of Gili Gili (*Lat.* 6° 52′ *S.*,

Charts 1066, 941b, 2759a, 1263.

Chart 934, plan of Ketapang bay.

Long. 115° 14′ E.), an islet situated close off the south-eastern shore of the bay, about 2 miles east-north-eastward of Tanjong Batoe Teteh.

There are several detached patches, with depths of from 3 feet to 4¾ fathoms (0^{m}9 to 8^{m}7), lying within 8 cables westward and north-westward of Gili Gili. A 3¼-fathom (5^{m}9) patch lies about 1¼ miles south-westward of the beacon on the southern Takat Patokanan, and two 4¾-fathom (8^{m}7) patches lie about 1¾ and 2 miles, respectively, south-westward of the same beacon. A one-fathom (1^{m}8) patch and a 3-fathom (5^{m}5) patch lie about 2 and 3¾ cables, respectively, west-north-westward of the beacon standing on the northern edge of the reef northward of Gili Gili.

Anchorages.—Directions.—There are two good anchorages in Ketapang baai. The northern anchorage is in depths of from 7 to 8 fathoms (12^{m}8 to 14^{m}6), hard clay, with Tanjong Batoe Goeloek bearing 305°, distant about 1¾ cables. The southern anchorage is in depths of from 3½ to 4 fathoms (6^{m}4 to 7^{m}3), soft clay, about 2 cables westward of the beacon on Takat Takat, in a small bight formed between Takat Loear and the coastal reef extending from the southern part of the bay; both anchorages afford good shelter.

Ketapang baai can be entered from south-westward on either of the two following leading marks: Tanjong Tinggi, about 3 cables northward of Tanjong Batoe Goeloek, in line with the eastern extremity of Mamboerit, bearing 045°, or the summit of Soemoer Batoe in line with the beacon surmounted by a white cone on the southern Takat Patokanan, bearing 057°; the latter, or southern, of these two leading lines, however, is not always easy to distinguish. If entering the bay by the northern leading line, when the eastern side of Kemirian (chart 1653c) is in line with Tanjong Saboea, the western extremity of the land southward of Ketapang baai, bearing 179°, the vessel will be approaching the detached patch, with a least depth of 1½ fathoms (2^{m}7) over it, lying about 1½ miles south-westward of Mamboerit; the vessel should, therefore, keep slightly south-eastward of the leading line just before Kemirian comes in line with Tanjong Saboea, keeping Bromo passage open. When Kemirian begins to be shut in behind Tanjong Saboea she may steer for the conspicuous peak of Soemoer Batoe until the beacons on Takat Patokanan are identified. If making for the northern anchorage course may be steered to pass about midway between Tanjong Batoe Goeloek and the beacon on the northern Takat Patokanan (*Lat. 6° 51′ S., Long. 115° 14′ E.*).

A vessel entering Ketapang baai through Bromo passage should keep the eastern extremity of Mamboerit in line with the western side of Kangean, bearing 199°, which leads through the northern part of the passage, and thence keep in mid-channel between Mamboerit and the rocky coast of Kangean.

The roadstead, known officially as Reede Ardjasa, is bounded by the meridian of 115° 12′ E. and the parallel of the northern extremity of Mamboerit.

Chart 1653c.

Islands eastward of Kangean.—Paliat is a wooded island, cultivated and inhabited in the eastern portion; it is separated from the eastern end of Kangean by a narrow channel. A ridge of hills runs through the entire length of the island, rising to an elevation of 466 feet

Charts 1066, 941b, 2759a, 1263.

Chart 1653c.

($142^{m}0$) at the north-western extremity. The coast is mostly inaccessible owing to mangroves.

Sepeken (*Lat. 7° 00′ S., Long. 115° 42′ E.*), lying close eastward of the south-eastern extremity of Kangean, is, although small, the principal island in the group after Kangean; it has a row of houses on the west and south coasts, several of which have zinc roofs. There is a stone pier for praus on the south-western extremity, and there is a salt warehouse here, a long building with a red roof and a Custom station. Bangkau and Paroppo, the latter between Sepeken and Paliat, are covered with mangroves and apparently uninhabited.

Selarangan, 1½ miles off the north-east coast of Paliat, has some scattered trees on it. Setabo, about 2 miles northward of Sepeken, is wooded. There is a hospital for infectious cases, a building with a red roof, on Saoelar (Saular), 2¾ miles north-eastward of Setabo. All these three islets lie on extensive reefs.

Sedoelang (Sedulang) besar, 2¼ miles south-eastward of Saoelar, is wooded and cultivated, and lies on an extensive reef. Sedoelang (Sedulang) kechil has a small high point, and there are some clumps of mangroves on the coastal reef; it lies on the same reef as Setabo. Pageroengan (Pagerungan) kechil, about 4 miles eastward of Sedoelang besar, is densely covered with coconut trees; Pageroengan (Pagerungan) besar is cultivated in the western part, and wooded in the eastern half.

Sepandjang (Sepanjang), the south-easternmost island of the Kangean group, is low and wooded. The north coast consists of mangroves, with deep creeks forming islands; the south and east coasts have sandy beaches. The fishing village Tandjoeng Kiau, is situated on the north-eastern extremity. Sesiil, on the reef extending northward from the north-western extremity of Sepandjang, has some scattered trees on it, and a village of the same name is situated on the eastern side. Seridi besar and Seridi kechil, about 2½ and 4 miles, respectively, north-eastward of Sesiil, are wooded and uninhabited; the northern extremity of Seridi kechil is sandy. The area between the Seridi eilanden and Sesiil and Sepandjang is foul.

Sepankoer (Sepankur) and Saoer (Saur), about 2 miles southward of Paliat, are high in the middle and cultivated. Saïboes (Saïbus), about 6 cables eastward of Saoer, has coconut plantations; there is a lying-up place for praus on the north coast.

Sekala, 18 miles eastward of Pageroengan besar, is the easternmost of the Kangean eilanden; although low, it has some high trees on it, and is visible from a distance of about 17 miles; it is fringed by a very steep-to coastal reef, the north-eastern edge of which is covered with vegetation, giving the appearance of a detached island when seen from westward. A 6-fathom ($11^{m}0$) patch lies about one mile westward of Sekala.

Anchorages.—Directions.—Anchorage may be obtained, in a depth of about 6 fathoms ($11^{m}0$), off the south-western side of Sepeken.

Vessels with local knowledge may obtain anchorage, in depths of from 11 to 18 fathoms ($20^{m}1$ to $32^{m}9$), mud, northward of Saoebi (Saubi), an island situated off the southern side of Kangean, about 6 miles westward of Paliat.

A vessel making for the anchorage off Sepeken (*Lat. 7° 00′ S., Long. 115° 42′ E.*) from eastward should keep Oostberg, the eastern-

Charts 1066, 941b, 2759a, 1263.

most summit, 883 feet ($269^{m}1$) high, of Kangean, in line with the southern side of Sedoelang besar, bearing 282°, which leads between the Pageroengan eilanden and the reefs extending nearly 6 miles northward from the north-eastern extremity of Sepandjang. She should continue on this alignment until the north-western side of Pageroengan besar is in line with the south-eastern side of Pageroengan kechil, bearing 070°, when she should alter course westward and keep this alignment on astern, with Bangkau bearing 250°. When the western extremity of Sepandjang comes in line with a sandbank lying nearly half a mile north-eastward of Saïboes, bearing about 165°, she should alter course northward so as to bring the western extremity of Sepandjang midway between the above sandbank and the eastern side of Saïboes, and anchor off the south-western extremity of Sepeken, taking care to avoid a rock, with a depth of less than 6 feet ($1^{m}8$) over it, lying half a mile south-eastward of the south-western extremity of Sepeken.

Approaching Sepeken from southward, Setabo in line with the western side of Bangkau, bearing about 017°, leads between Saoer and Saïboes.

Islands and reefs northward of Kangean.—In the area northward of Kangean eilanden, as far as the parallel of 6° 20′ S., are a great number of islets and reefs, consisting of coral, sand and shells, rising from deep water; no marks can be given for avoiding these dangers, and navigation in this area is, therefore, inadvisable. So far as is known, there are no dangers within a distance of 20 miles of the line joining Pageroengan besar and Sekala, and there are considerable depths here.

Araän, the largest and northernmost islet, lies about 27 miles northward of Saoelar and has high trees on it. Aloean (Aluan), 9 miles southward of Araän, has three round-topped trees on it. Igangan, about 5 miles south-westward of Aloean, has high trees on it. Segentoh, about 1¾ miles south-eastward of Aloean, has a row of slender casuarina trees on it. These four islets are all visible from a distance of about 13 miles in clear weather. Miongan, about 3 miles south-south-eastward of Igangan, has a noticeable tree on it, and is visible about 8 miles. Timoenan (Timunan), 8½ miles north-westward of Igangan, is covered with low vegetation, and is visible about 7 miles. Boengin Njampoer (Bungin Nyampur), 3 miles south-south-westward of Timoenan, is merely a sandbank covered with vegetation, but is visible about 6 miles. All the above islets are uninhabited, but fishermen stay there temporarily.

Prins Maurits reef, with a depth of 8 feet ($2^{m}4$) over it, lies about 25 miles northward of the north-western extremity of Kangean, and a 6-fathom ($11^{m}0$) patch lies about 6 miles west-north-westward of the reef; these are the north-westernmost dangers northward of Kangean. Kwong Eng reef, with a least depth of 5 feet ($1^{m}5$) over it, lies about 25 miles northward of Sekala (*Lat. 6° 56′ S., Long. 116° 15′ E.*). A bank, with a depth of 11 fathoms ($20^{m}1$) over it, was reported, in 1945, to lie about 21 miles north-eastward of Kwong Eng reef.

The reefs are all marked by discoloration when the sky is clear, but sometimes do not show at all when it is cloudy. During the east monsoon, especially in July and August, it is usually very hazy, with bad reef sight; in the west monsoon it is generally clear, although

Chart 1653c.

heavy squalls suddenly come up, the land being obscured by rain, and a heavy sea rising in a short time. As a rule, the less the depth on the reef, the plainer the discoloration, but frequently the latter is very irregular on the same shoal and does not continue to the edges, so 5
that a reef marked by discoloration should not be approached too closely. Occasionally, at low water, there is surf on the drying reefs, but otherwise they scarcely ever break. Except under the coast of Kangean the water is very clear.

Charts 1066, 941b, 2759a, 1263.

CHAPTER VII

SOUTH COAST OF JAVA AND STRAAT BALI

Charts 1653a, 1653b, 1653c.

SOUTH COAST OF JAVA.—General remarks.—Unlike the north coast of Java, which in most places presents a low front to the sea, with regular soundings, and anchoring ground almost everywhere, the south coast of the island is generally high, consisting of steep rocks and rugged points, covered always with breakers, and the whole having a barren and desolate appearance. In general, great depths will be found in the immediate vicinity of the coast, and although in some places a less forbidding beach and a decreased depth may be found, yet they very seldom afford a fit spot for anchoring, by reason of a heavy swell which breaks unceasingly on all exposed points, or rolls into the bays and havens. Notwithstanding this, the south coast of Java is not altogether destitute of places of refuge, for there are certain bays and harbours which afford shelter in either monsoon.

From the small extent of Java in latitude, and the consequent nearness of its north and south coasts, the mountains serve as landmarks equally on either side of the island. Throughout the west monsoon some of these mountains may be discerned at a distance of from 45 to 75 miles, but in the east monsoon they are generally rendered invisible by a hazy atmosphere, and are, therefore, not distinguishable till very near.

Climate and weather.—*See* page 17.

The sea is frequently turbulent, and generally beats upon the coast.

Currents and tidal streams.—Few particulars have been obtained of the horizontal movement of the water off the south coast of Java, but a mixture of weak tidal stream and weak monsoon current may be expected. The tidal stream is almost entirely semi-diurnal, and, generally speaking, when the water is rising the stream sets westward and when falling, eastward.

Charts 2056, 1653a.

Coast.—Dangers.—Between Tanjong Tjangkoeang (page 44) and Tanjong Tereleng, a low sandy point, about 9 miles eastward, the coast forms a bight, the western shore of which, for about 2½ miles northward of Tanjong Tjangkoeang, is high and rocky, but is thence low and sandy to Tanjong Tereleng (*Lat. 6° 51′ S., Long. 105° 25′ E.*).

Karang Pabajang, about 4 cables southward of Tanjong Tjang-

Charts 2056, 1653a.

koeang, is described on page 44. A rock, which dries, lies about half a mile eastward of Tanjong Tjangkoeang, and 2 cables offshore. Two rocks, which dry, and some rocks above water lie about 2¼ miles north-north-eastward of Tanjong Tjangkoeang, and within 4 cables of the coast.

Tanjong Panggorak and Tanjong Sodong, about 3½ and 7 miles, respectively, eastward of Tanjong Tereleng, are tolerably high and prominent, and are fringed by reefs; between Tanjong Tereleng and Tanjong Panggorak is the low, swampy neck at the head of Welkomst baai (page 45). *See* view facing page 143.

When navigating at a considerable distance from the coast, the high land northward of Tanjong Sodong, and that on the peninsula Oedjoeng Koelon (page 44), afford some very prominent marks. The 1,345-foot (409^{m}9) summit, at the southern end of the Hondjé (Honjé) gebergte, 3¾ miles northward of Tanjong Sodong, is only noticeable from south-westward. *See* view facing page 143.

The coast between Tanjong Sodong and Tanjong Panto, about 22 miles eastward, consists mostly of sand dunes, bordered by a sandy beach broken in places by rocks, and there is a heavy surf everywhere; the low land behind is thickly wooded. Tanjong Panto is low, inconspicuous, and fringed by a reef. Excellent anchorage may be obtained off the coast between Tanjong Tereleng and Tanjong Panto.

Two shoals, with depths of 4¾ and 3¾ fathoms (8^{m}7 and 6^{m}9), over them, lie 1¾ and 2¾ miles, respectively, south-eastward of Tanjong Sodong.

A 3¼-fathom (5^{m}9) patch lies about 2½ miles south-eastward of Tanjong Mentajoeng (Mentayung), situated about 7½ miles westward of Tanjong Panto (*Lat. 6° 51′ S., Long. 105° 54′ E.*).

Binoeangeun (Binuangan) rivier flows out immediately westward of Tanjong Panto, and Binoeangeun (Binuangön) village is situated at the mouth, but is not visible from seaward; boats can enter the river through a channel in the coastal reef, and the village can also be reached by landing on the north-eastern side of Tanjong Panto. Binoeangeun rivier is the only river on the southern coast of Java, the mouth of which does not silt up in the east monsoon.

In the west monsoon there is anchorage, with good holding ground, eastward of Tanjong Panto, but a considerable swell frequently runs round the point.

Eastward of Tanjong Panto the coast continues to be low for about 9 miles, and then gradually rises; a narrow reef extends about one mile southward from the coast about 9 miles eastward of Tanjong Panto.

Chart 1653a.

Between Ujong Karang Taradje (Taraje), about 21 miles east-south-eastward of Tanjong Panto, and Wijnkoops baai (page 154) the coast is high, rocky, and thickly wooded. A rock, which dries, lies about 6 miles north-westward of Ujong Karang Taradje and one mile offshore, and a 2¾-fathom (5^{m}0) patch lies 2½ miles north-westward of this point.

Off-lying islands.—Klapper or Deli eiland, about 7 miles southward of Tanjong Sodong, is low and swampy in the middle, but elsewhere is thickly wooded, and there are coconut trees along the beach. Trouwers or Tindjil (Tinjil) eiland, about 12 miles eastward of Klapper

Chart 941a.

Chart 1653a.

eiland, is thickly wooded. Both Klapper and Trouwers eilanden are uninhabited, but the latter is visited by fishermen. During the east monsoon, when the anchorage eastward of Tanjong Panto is unsafe, vessels of the Koninklijke Paketvaart Maatschappij anchor under the lee of Trouwers eiland.

Wijnkoops baai.—Wijnkoops baai (Wynkoops bay) or Palaboehan Ratoe is entered between Ujong Sinini, about 7¼ miles east-south-eastward of Ujong Karang Taradje (*Lat. 6° 57′ S., Long. 106° 15′ E.*), and Ujong Karang Bentang, 10 miles south-south-eastward; it is backed by thickly wooded mountains, and in some places rugged points project, with a few scattered rocks extending about one cable offshore. Several streams flow into the bay, but the only one of any importance is the Tjimandiri, on the eastern shore and about 8 miles north-eastward of Ujong Karang Bentang; owing to the heavy surf at its mouth, however, this river is usually inaccessible.

Chart 3672, plan of Palabuhanratu road.

Reede Palaboehanratoe. — Lights. — Buoys. — The village of Palaboehanratoe (Palabuhanratu) stands at the mouth of the Tjipalaboehan (Chipalabuhan), which discharges into the head of Wijnkoops baai. A pier, where boats can lie alongside, extends from the shore about half a cable northward of the river entrance; there is a noticeable cupola near the beach between the pier and the river.

The roadstead, which is visited by vessels of the Koninklijke Paketvaart Maatschappij, is bounded by the arc of a circle of 3 miles radius from the head of the pier.

A light is exhibited, at an elevation of 23 feet ($7^{m}0$), from an iron column near the root of the pier at Palaboehanratoe. A light is occasionally exhibited from a white pillar about half a mile southward of the pier.

A black can buoy is moored about 1¾ cables south-westward of the head of the pier, and there is a mooring buoy about one cable south-westward.

Anchorage.—Directions.—Except along the northern and eastern shores of Wijnkoops baai, the depths are too great for anchoring. The most suitable anchorage, for vessels with local knowledge, is in an inlet in the coastal reef, which is covered at all states of the tide, in depths of from 9 to 18 fathoms ($16^{m}5$ to $32^{m}9$), off Palaboehanratoe. A vessel should approach this anchorage with the light-structure bearing about 052°. This anchorage is sheltered in the south-east monsoon, but heavy storms sometimes occur in the west monsoon. The approach of bad weather, however, is usually predicted by the local fishermen from the changes they observe in the direction of the streams in the bay; all praus are then hauled up on the beach, and they do not venture out the next day.

No particulars have been obtained of the tidal streams in Wijnkoops baai, but after heavy rains a weak south-going stream from the Tjimandiri was observed. At night the land wind usually blows from north-east or south-east.

Chart 932, plan of Zand bay.

Zand baai.—Islets and dangers.—Zand baai, immediately southward of Wijnkoops baai, is entered between Tanjong Karang Ragok, situated 1½ miles south-south-westward of Ujong Karang Bentang, and Tanjong Karang Tjapis (Chapis), 3½ miles west-south-westward.

Chart 941a.

Chart 932, plan of Zand bay.

Except at the head of the bay, where the land is high and marshy alternately, the mountains reach nearly to the coast. The depths decrease rapidly towards the head of the bay.

A reef, partly always above water, lies about 2 cables southward of Tanjong Karang Ragok. Rametoek (Rametuk), a cliffy, wooded islet, lies about 3¼ cables offshore on the southern side of the bay, and Manoek (Manuk), a rocky islet, lies 2¾ cables south-westward of Rametoek (*Lat. 7° 11′ S., Long. 106° 27′ E.*). There are numerous rocks, above and below water, around these islets, and extending about 4 cables seaward; a sunken rock lies near the edge of the 5-fathom ($9^{m}1$) line, about 2½ cables northward of Tanjong Koenti (Kunti), situated about 2 miles eastward of Tanjong Karang Tjapis. There is less surf in the vicinity of these rocks at low water than at high water.

Castor klip, a small pinnacle rock, with a depth of 2 feet ($0^{m}6$) over it, surrounded by depths of over 11 fathoms ($20^{m}1$), lies about 6¾ cables northward of Tanjong Koenti; it is particularly dangerous, as it can only be distinguished when there is a swell. A coral patch, with a depth of 8 fathoms ($14^{m}6$) over it, and steep-to, lies about one mile north-north-westward of the same point.

Although the bay was carefully surveyed in 1920, it is possible that some rocks, in addition to those shown on the chart, may exist.

Tjiletoeh (Chiletuh), which flows out about 1¼ miles eastward of Tanjong Koenti, is navigable for boats at half tide for a distance of 4 miles. Tjikanteh (Chikanteh), which flows out at the head of the bay, has a small but noticeable waterfall near Balekambang village, close to the shore, and 2 miles inland is a large waterfall, about 790 feet ($240^{m}8$) high, named Sodong.

Anchorage.—The best anchorage for large vessels is in the middle of the bay, in a depth of about 12 fathoms ($21^{m}9$), mud and sand, with Rametoek bearing 150°, distant about 9½ cables, and Tanjong Karang Tjapis, 242°; a vessel will then lie about 4 cables north-north-eastward of Castor klip. Closer inshore the bottom becomes hard. This anchorage should not be used during the west monsoon.

Chart 1653a.

Coast.—In the coast between Tanjong Karang Tjapis and Ujong Genteng, 11½ miles southward, are several bights, with white sandy beaches, separated by prominent points formed by spurs from the hilly land behind. Owing to the numerous rocks which fringe this stretch it is advisable to give the northern part of this coast a berth of at least one mile; the outermost of the rocks is Karang Antoe, a rock partly above water, which lies half a mile offshore and about 1¾ miles south-south-westward of Tanjong Karang Tjapis.

Ujong Genteng is a low peninsula, covered with tall trees, and can easily be identified, especially from westward. It is fringed by a reef, which dries, extending in some places to a distance of 4 cables, with some large rocks on it; the southern part of this reef is prolonged in a south-south-easterly direction for a further 7 cables by a rocky ridge, with a depth of about 3¾ fathoms ($6^{m}9$) over its outer end; in the south-east monsoon there is a heavy surf on this ridge, but in the west monsoon there is not even a ripple.

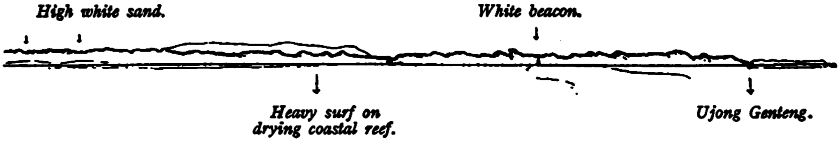
Westbaai Genteng.—Beacons.—Buoys.—On the western side of the peninsula an inlet in the coastal reef, known as Westbaai Genteng, about 1½ cables wide at the entrance, trends north-north-eastward

Chart 941a.

Chart 1653a.

towards the neck of the peninsula. During semi-diurnal neap tides the coastal reef remains dry throughout the day. A beacon surmounted by a black cone marks the edge of the coastal reef on the western side of the inlet, about 1½ cables within the entrance; a white beacon stands on the neck of the peninsula, at the head of the inlet, and close south-eastward of this beacon there is a very prominent shed with a zinc roof. A pier extends about 1¼ cables in a southerly direction to the edge of the coastal reef on the western side of the inlet, and two mooring buoys lie off its head, the outer one in a depth of about 20 feet ($7^{m}0$).

Anchorages.—Directions.—During the south-east monsoon there is anchorage off the entrance to Westbaai Genteng, in a depth of 11 fathoms ($20^{m}1$), with Ujong Genteng in line with a rock on the coastal reef about 1¾ cables westward of the point, bearing 096°; a saddle mountain in the distance will also be seen on this alignment behind the point. In this depth a vessel will be about 1⅛ cables from the coastal reef, but, if considered too close in, anchorage can be obtained farther out on the same mark, in depths of from 14 to 16 fathoms ($25^{m}6$ to $29^{m}3$), although a heavy swell will be felt here.


High white sand.
White beacon.
Heavy surf on drying coastal reef.
Ujong Genteng.

Ujong Genteng in line with a rock on the coastal reef, bearing 096°.

(*Original dated* 1931.)

To enter Westbaai Genteng, from westward, the vessel should take care to keep southward of the leading mark given above for the outer anchorage, and, when the white beacon at the head of the bay bears 029°, she should steer for it on that bearing, which will lead about a quarter of a cable from the surf marking the edge of the drying reef on the eastern side of the entrance, and a little less distance from the reef on the western side. From eastward, Ujong Genteng should not be rounded in a depth of less than 20 fathoms ($36^{m}6$), and not less than 1¼ miles from the point.

Oostbaai Genteng, on the eastern side of the peninsula, affords anchorage in the west monsoon, with north-westerly winds, but it is of little importance; the southerly swell sets round Ujong Genteng (*Lat. 7° 23′ S., Long. 106° 24′ E.*) and into the bay, usually rendering landing impracticable.

Tidal streams.—A strong tidal stream may be encountered off Westbaai Genteng, but the rate has not been determined. The maximum rate of the south-going tidal stream occurs at the time of the semi-diurnal high water, and that of the north-going tidal stream at the time of low water. There is practically no tidal stream inside the bay.

During the survey, in October, 1911, there was a light south-south-easterly wind in the mornings, but towards noon it increased regularly, reaching its maximum force in the evenings, and then dying down

Chart 941a.

Chart 1653a.

again. With a south-going tidal stream, especially at high water, a confused sea is thus caused in the outer road.

Coast.—The coast between Ujong Genteng and Tanjong Bodjong Kerentjeng, the southern entrance point of Baai van Tjilaoeteurem (Chilautörem bay), nearly 80 miles eastward, is low, straight, and monotonous; there are great depths a few miles off the coast, but no soundings have been taken near the coast. Papandajan, 20 miles northward of Baai van Tjilaoeteurem, has a broad summit 8,724 feet (2,659^{m}1) high, with five peaks; Tjisorog (Chisorog), 4,630 feet (1,411^{m}2) high, lies 12 miles west-south-westward of Papandajan.

Chart 3672, plan of Chilautörem bay.

Baai van Tjilaoeteurem.—Light.—Tanjong Bodjong Kerentjeng (*Lat. 7° 40′ S., Long. 107° 41′ E.*) is wooded with high trees. A reef, which partly dries, named Karang Kapoetihan (Kaputihan), extends 2 cables west-north-westward from the point, and is prolonged for a further three-quarters of a mile in the same direction by a spit, with depths of from 3 to 5 fathoms (5^{m}5 to 9^{m}1) over it; a large and very prominent rock above water lies on Karang Kapoetihan. Tjilaoeteurem (Chilautörem), which flows out on the northern side of Tanjong Bodjong Kerentjeng, is navigable for praus, but they can only cross the bar at high water spring tides.

The roadstead is bounded by the parallel of 7° 40′ S. and the meridian of 107° 40′ E.

A light is exhibited, at an elevation of 69 feet (21^{m}0), from a white iron framework structure, 32 feet (9^{m}8) in height, on Tanjong Bodjong Kerentjeng.

A breakwater, which shelters a small harbour on its western side, extends north-north-eastward from Tanjong Bodjong Kerentjeng. A prominent shed is situated on the western side of the breakwater. A prominent house and white shed are situated about 3½ cables east-north-eastward and 2½ cables eastward, respectively, of the light-structure; a bridge extends south-westward across the Tjilaoeteurem, close to the landing place.

There is anchorage northward of the prominent rock mentioned above, in depths of from 7 to 9 fathoms (12^{m}8 to 16^{m}5), but it is not safe, as a slight change in the direction of the wind quickly raises a heavy swell. The landing place is at some huts on the northern side of the river mouth, otherwise the shore is inaccessible.

Chart 1653a.

Coast.—About 10½ miles east-south-eastward of Tanjong Bodjong Kerentjeng is Tanjong Gedeh; thence to Tanjong Madasari, about 40 miles farther eastward, the coast is low, wooded and cultivated. There appear to be no off-lying dangers, though reefs, on which the sea usually breaks with violence, extend not more than about half a mile from most of the points, and in every bight a heavy surf rolls up the white sandy beach. Manoek (Manuk) eilandjes lie close to the coast 11 miles westward of Tanjong Madasari; the western islet is rounded, the other one is lower and flatter.

Chart 1653b.

Penandjoeng baai.—Dangers.—Penandjoeng (Penanjung) baai, entered between Tanjong Madasari and Tanjong Solok Bokong, the south-western extremity of Nusa Kambangan, about 17½ miles eastward, is divided into two bays by Penandjoeng, a peninsula, 466 feet

Chart 941a.

Chart 1653b.

(142^{m}0) high, the southern extremity of which is named Tanjong Simanggoe (Simanggu). Neither bay is of any importance to shipping, and they have not been thoroughly surveyed.

Dirk de Vries baai, the western of the two, appears to be foul in the north-western part; Batu Mandi extends about 3 cables westward from the north-western extremity of Penandjoeng peninsula, and partly dries.

Maurits baai, the eastern, has a good holding ground of sand, throughout; it appears to be free from danger, except for a reef extending about 2 cables from the north-eastern side of Penandjoeng peninsula, and Amboer Badak, a small reef lying about 1¼ miles north-westward of Tanjong Solok Bokong (*Lat. 7° 44′ S., Long. 108° 42′ E.*) and 3 cables offshore.

The bay is bounded by the parallel of 7° 45′ S. and the meridian of 108° 47′ E.

Nusa Kambangan.—Light.—Off-lying danger.—This island is separated from Java by a very narrow channel, the western entrance to which is in the north-eastern part of Maurits baai, and the eastern on the western side of Schildpadden baai; the eastern end of the channel is known as Zeegat van Tjilatjap. Nusa Kambangan rises to an elevation of 663 feet (202^{m}1) in the eastern part, and is covered with large trees. The southern, western and eastern sides of the island are steep. Northward of the western end of Nusa Kambangan the channel expands into a large lagoon, named Segara Anakan, with general depths of less than 3 feet (0^{m}9) and there are numerous patches which dry.

A light is exhibited, at an elevation of 607 feet (185^{m}0), on Tanjong Tjimiring (Chimiring), the south-eastern extremity of Nusa Kambangan.

A shoal, with depths of 4¾ fathoms (8^{m}7) over it, was reported, in 1947, to extend from a position about 3½ miles south-westward to the same distance eastward of Tanjong Tjimiring.

Chart 932, plans of Chitando and Chilachap inlets.

The western entrance to Segara Anakan, in Maurits baai, is divided into two parts by Nusa Wré, a high, rocky, densely wooded islet; in addition, several rocks render this passage tortuous and dangerous, and it should not be attempted without local knowledge. The channels northward and southward of Nusa Wré are named Tjiseël (Sehel) and Tjitandoei (Chitando), respectively.

From the eastern end of Segara Anakan a narrow, shoal passage, named Aloer Passoeroeang (Alur Passuruang), leads into Zeegat van Tjilatjap, but it can only be used by small craft with local knowledge.

Chart 932, plan of Chilachap inlet.

Zeegat van Tjilatjap.—Light.—Zeegat van Tjilatjap (Chilachap inlet), between the eastern extremity of Nusa Kambangan and the south coast of Java, affords the best anchorage on the whole of this coast of Java, and vessels can lie here in perfect safety during both monsoons. The entrance channel runs close northward of Tanjong Karang Bolong, the north-eastern extremity of Nusa Kambangan; on the northern side of the channel is an extensive bank of hard sand, which partly dries, extending about one mile south-eastward from the northern entrance point, situated about 1½ miles west-north-westward of Tanjong Karang Bolong. A narrow steep-to reef extends from the southern side.

Chart 941a.

Chart 932, plan of Chilachap inlet.

The town of Tjilatjap stands on the northern side at the head of the inlet, about 2 miles north-westward of the northern entrance point; it is the headquarters of a Government official. Kali Donan discharges along the western side of the town.

A light is exhibited, at an elevation of 27 feet ($8^{m}2$), from a white iron framework structure, on the coast about one mile northward of the northern entrance point of the inlet.

The least depth on the leading line (*see* below) about one mile eastward of the front leading beacon was 20 feet ($6^{m}1$) in 1948.

Swept channel.—Beacons.—Buoys.—A black can buoy lies about 3¾ cables east-south-eastward of Tanjong Karang Bolong (*Lat. 7° 46′ S., Long. 109° 03′ E.*). A black beacon, surmounted by a truncated cone, stands about 2½ cables westward of the same point and about half a cable from the southern shore.

There is a swept channel leading into Zeegat van Tjilatjap, marked by buoys and beacons as follows:—

A red conical buoy, surmounted by a ball, at the outer end of the channel, about 3½ miles east-north-eastward of Tanjong Karang Bolong; two red mooring buoys, about 2¼ miles and three-quarters of a mile, respectively, east-north-eastward of the same point. A white conical buoy on the north-western side of the channel, about 2½ cables west-south-westward of the black beacon, situated 2½ cables westward of Tanjong Karang Bolong.

Two leading beacons are situated at the entrance to Zeegat van Tjilatjap; the front beacon, which is black, surmounted by two white triangles, disposed vertically, points up, stands on the flat which partly dries, about one mile westward of Tanjong Karang Bolong; the rear beacon, which is white, surmounted by two white triangles, disposed vertically, points down, stands on the south-western shore of the inlet, 6¼ cables westward of the front beacon.

On the Nusa Kambangan shore are three pairs of stone beacons, named from seaward:—Inner beacons, Western screens, and Small beacons. There is also a pair of leading beacons, for the inner roadstead, at the mouth of Kali Donan, on Tanjong Sodong. All these leading marks are described in detail on page 161.

A beacon, surmounted by a white triangle, stands on the shore reef about 1¾ cables north-westward of the front Western screen.

Roadsteads.—In the west monsoon, or with westerly winds, there is safe anchorage in the outer road, with little sea, under the lee of Nusa Kambangan, in depths of from 6 to 7 fathoms ($11^{m}0$ to $12^{m}8$), southward of the alignment of the outer pair of leading beacons eastward of Tanjong Karang Bolong. In the south-east monsoon vessels can usually wait for the pilot here, but with strong south-easterly winds the pilot may be unable to proceed outside, and when such is the case this anchorage is unsafe; if possible, vessels should proceed inside Tanjong Karang Bolong, where there is shelter from wind and sea.

Inside Zeegat van Tjilatjap there is sheltered anchorage, under all conditions, in a depth of 5 fathoms ($9^{m}1$), sand, in the bight south-eastward of Tanjong Sodong. Vessels exceeding 260 feet ($79^{m}2$) in length should moor. There is also good holding ground westward of the town opposite the piers, where there are several mooring buoys.

Charts 1653b, 941a.

Chart 932, plan of Chilachap inlet.

The inner roadstead is bounded by the meridians of 108° 59′ 10″ E. and 109° 02′ 08″ E. and by the parallels of 7° 43′ 25″ S. and 7° 45′ 00″ S.

Prohibited anchorage.—Obstruction.—Anchorage is prohibited in an area indicated on the chart south-westward of the northern entrance point of Zeegat van Tjilatjap. An obstruction is situated in this area.

Tidal streams.—The tidal streams in Zeegat van Tjilatjap are almost entirely semi-diurnal. In the channel they usually follow the direction of the leading marks, but on either side they run over the banks; off the entrance to the inlet there is an almost constant north-going stream. Owing to the influence of Kali Donan, especially in the wet season, the duration of the out-going stream is usually longer than that of the in-going stream. In the bight in which the Western screens stand, the in-going stream sets south-westward towards the Small beacons, and the out-going stream north-eastward towards the Inner beacons (*Lat. 7° 45′ S., Long. 109° 02′ E.*).

At neap tides the rate of the stream is usually from a half to one knot, but at spring tides this may increase to 2 or 4 knots, and, in the wet season, the out-going stream has been known to attain a rate of 5 knots. As a rule, the maximum rate of the stream occurs about two hours after the changes in the vertical movement in the water.

Pilotage.—Pilotage is compulsory, with the few exceptions mentioned in the Netherlands Pilotage Regulations. Pilotage at night is prohibited, and vessels arriving at night should not make the signal for a pilot until daybreak. Signals for a pilot are acknowledged from the lighthouse on Gunong Tjimiring (Chimiring), and the information is telephoned to the pilot station at Tjilatjap; it takes about one hour for the pilot to proceed outside from Tjilatjap. For Pilot and special communication signals *see* pages 11 and 12 respectively.

Quays.—There are four quays along the western side of the town, at the mouth of Kali Donan; these are known locally—from north to south—as quays Nos. I, II, III, and IV. The last three form one continuous quay, and there is a space of about a quarter of a cable between the southern end of No. I quay and the northern end of No. II. No. I is 394 feet ($120^{m}1$) long, with a least depth of 10 feet ($3^{m}0$) alongside, but the upper part was unserviceable in 1948. Nos. II, III and IV have a total length of 1,378 feet ($420^{m}0$), with depths of from 16 to 23 feet ($4^{m}9$ to $7^{m}0$) alongside, but at a distance of about 16 feet ($4^{m}9$) from the quays there are depths of from 22 to 26 feet ($5^{m}7$ to $7^{m}9$). Northward of No. I quay is the petroleum wharf, with a depth of 18 feet ($5^{m}5$) alongside. Vessels up to 279 feet ($85^{m}0$) in length can berth alongside the petroleum wharf. At the south-western end of the town north-north-eastward of Tanjong Sodong, there is a Government wharf, with a slip for small vessels close westward of it.

Directions.—Beacons.—A vessel bound for Zeegat van Tjilatjap from southward will find Slamet, known also as Piek van Tegal, a volcano (chart 1653b), situated about 33 miles north-north-eastward of Tanjong Karang Bolong, an excellent mark in clear weather, as it can be identified from a great distance. When the lighthouse on Tanjong Tjimiring and Solok, a prominent hill, 403 feet ($122^{m}8$) high, about 10 miles north-eastward of Tanjong Karang Bolong, can be identified. She should steer for the outer buoy marking the swept-

Chart 932, plan of Chilachap inlet.

channel. Care should be taken that the isolated group of mountains near Tanjong Karang Bata (page 162), the eastern entrance point of Schildpadden baai, which has the appearance of an island from a distance, is not mistaken for Nusa Kambangan.

On nearing Tanjong Tjimiring care should be taken to avoid the 4¾-fathom (8^{m}7) shoal reported to lie south-eastward of that point (*see* page 158). When the outer leading beacons in the entrance of Zeegat van Tjilatjap are in line, bearing 264½°, the vessel should alter course westward and keep on this alignment until the Small beacons situated about 8½ cables west-south-westward of Tanjong Karang Bolong, are in line, bearing 226½°. Small beacons are each surmounted by a five-sided board; the front board is white, and the rear board white with three black vertical stripes. These two boards are exactly in line on the bearing 226½° (*see* Fig. 1); if only one of the black stripes of the rear board is covered by the front board (*see* Fig. 2) the vessel is as far out of the leading line as is consistent with safety. One of these boards was reported, in 1948, to have disappeared.

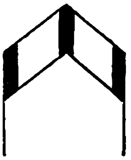


Fig. 1

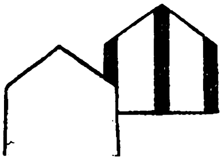


Fig. 2

The Inner beacons, situated near Karang Rempak, about 4½ cables west-south-westward of Tanjong Karang Bolong (*Lat. 7° 45′ S., Long. 109° 03′ E.*), are in line bearing 090½°; they are similar to the Small beacons, and the same remarks apply.

The Western screens, situated 7¼ cables west-south-westward of Tanjong Karang Bolong, are right-angled triangles with their longest sides upright, and, in line bear 125°. The rear screen was reported, in 1948, to be obscured.

Two leading beacons, similar to the Small beacons, on Tanjong Sodong, in line, bearing 178°, indicate the channel to the anchorage in the mouth of Kali Donan.

When the Small beacons are in line the vessel should keep on their alignment until the Inner beacons are in line, when she should bring them astern, bearing 090½°, and keep on that alignment until the front western screen is in line with the beacon surmounted by a white triangle about 1¾ cables north-westward, when she should bring them astern, bearing 125°, and then keep on this alignment until the pier situated about 2½ cables north-westward of the northern entrance point is abeam, passing about half a cable north-eastward of a 3¼-fathom (5^{m}9) patch lying about 2½ cables southward of the pier. Then she should steer to pass southward of the mooring buoys situated between this pier and Tanjong Sodong, and southward of the white conical buoy marking a 2¾-fathom (5^{m}0) patch about 1½ cables north-eastward of Tanjong Sodong, and thence bring the leading beacons on that point astern, bearing 178°, which leads to the anchorage off the piers.

Harbour facilities.—Water may be obtained at Tjilatjap; in

Charts 1653b, 941a.

Chart 932, plan of Chilachap inlet.

1947, it could be delivered at a rate of 150 tons per day. Provisions are plentiful. There is a slip for small vessels.

Tjilatjap is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. It is connected to the main railway system of Java. It is also connected with the general telephone and telegraph systems. A canal connects with Kali Serajoe (Serayu), which flows into Schildpadden baai, about 6 miles north-eastward of Tanjong Karang Bolong.

Chart 1653b.

COAST.—Schildpadden baai, entered between the eastern end of Nusa Kambangan and Tanjong Karang Bata, about 2 miles eastward, does not afford good anchorage in either monsoon. Some rivers that flow into it, carrying out trees and shrubs in abundance, cause irregular currents, with patches of discoloured water and ripples. The mouth of Kali Serajoe is generally inaccessible owing to surf.

Tanjong Karang Bata is the extremity of a high promontory, the low land on either side rendering it very noticeable. Heavy surf makes landing impracticable on this rocky coast, and, as uncharted rocks may exist close inshore, it should be given a wide berth.

The entire coast between Tanjong Karang Bata (*Lat.* 7° 46′ *S., Long.* 109° 24′ *E.*) and Patjitan (Pachitan) baai, about 104 miles east-south-eastward, is inaccessible owing to heavy surf. The western half, between Tanjong Karang Bata and the mouth of Opak rivier, about 54 miles east-south-eastward, consists of a low plain fronted by a chain of sand dunes about 25 feet ($7^{m}6$) high; the eastern half is more mountainous, and the coast is steep and has a desolate appearance.

So far as is known, there are no off-lying dangers, but the only portion that has been systematically surveyed is that westward of the mouth of Opak rivier, as far as the mouth of Bogowonto rivier, 17 miles west-north-westward. Soundings taken here show that the 100-fathom ($182^{m}9$) line lies at a distance of about 7 miles from the coast, the bottom being very regular within this depth, but rising abruptly near the coast; the 10-fathom ($18^{m}3$) line lies about 1½ miles offshore on either side of the mouth of Opak rivier, but near the mouth of Bogowonto rivier it approaches to within about 3 cables of the coast; the 5-fathom ($9^{m}1$) line runs at a distance of from one to 1½ cables offshore. The average depth at 3 miles offshore is 27 fathoms ($49^{m}4$), but, owing to the heavy swell and surf it is inadvisable for a vessel to approach within 2 miles of the coast. Opak rivier and Progo rivier, 4½ miles west-north-westward, although moderately wide inland, have shoal, inaccessible mouths, and the Bogowonto is of still less importance.

Gepak, 2,815 feet ($858^{m}0$) high, lies about 9 miles north-eastward of the mouth of Bogowonto rivier, and 2½ miles northward of the mouth of Progo rivier is the prominent chimney of the Sewoegaloer sugar factory. Eastward of Opak rivier, Kidoel (Kidul) gebergte rises steeply from the sea; there is a noticeable windmill on the sand dunes south-westward of Selawoe (Lawu), at the western end of this range and about 4½ miles eastward of the mouth of Opak rivier.

Chart 932, plan of Pachitan bay.

Patjitan baai.—The entrance to Patjitan (Pachitan) baai, between Tanjong Karangsemanda (Karang Semondo) and Tanjong Ngamber,

Chart 941a.

Chart 932, plan of Pachitan bay.

about one mile eastward, is difficult to identify from a distance, but a white stone pyramid on the summit of a hill, 2¾ cables north-eastward of Tanjong Ngamber, and a similar pyramid about 1¼ cables south-westward of Tanjong Kowang, on the western side of the bay, about 6 cables northward of Tanjong Karangsemanda, can be seen from a considerable distance under favourable conditions; (*see* view on plan, and facing page 143). The northern shore of the bay consists of a white sandy beach, but the heavy surf renders it impracticable for landing; elsewhere the shore is rocky. Grindoeloe (Pachitan) rivier flows into the eastern side of the bay, but it is practically inaccessible owing to the surf.

There is anchorage, in a depth of 7 fathoms ($12^{m}8$), sand and clay, off Tamperan (Tempuran) village, on the western side of the bay, about half a mile northward of Tanjong Kowang, where there is a small strip of sandy beach. The only part of the bay where there is no surf is at the head of Megelon or Pollux baai, on the eastern side close inside the entrance; there is just sufficient space for a small vessel to anchor in this bay, but communication with Patjitan, the chief village of the district, situated on Grindoeloe river, is very difficult over the intervening mountains. Patjitan baai should be entered on a northerly course, passing midway between the two entrance points; Limo (chart 1653b), about 7 miles east-north-eastward of Tanjong Ngamber (*Lat. 8° 14′ S., Long. 111° 06′ E.*), with a very jagged summit, is easily identified.

Chart 1653b.

Coast.—Dangers.—The coast between Patjitan baai and Panggoel baai, about 20 miles eastward, is high and rocky; as it has not been accurately surveyed it should be given a wide berth. Koeripan (Kuripan) baai and Damas baai, situated one on each side of Tanjong Lorog, which lies about 12 miles eastward of Tanjong Ngamber, are unsuitable for anchorage, and may be encumbered with rocks; heavy breakers were seen about one mile south-eastward of Damas baai, and a rock is charted about three-quarters of a mile offshore and about 2 miles east-south-eastward of Tanjong Lorog.

Chart 932, plan of Pangul bay.

Panggoel baai.—Dangers.—Panggoel (Pangul) baai is visited by coasting traders, but it only affords safe anchorage during the east monsoon. Two small rivers, Kali Gedangan (Pangul) and Kali Konang, flow into the north-eastern part of the bay; Gada, an islet, 167 feet ($50^{m}9$) high, fringed by rocks, lies about 3¼ cables south-south-westward of the mouth of the former.

There is anchorage off the mouth of Kali Konang, in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), but as a vessel lying there is exposed to a heavy swell, and landing is difficult, it is preferable to anchor farther southward, in Djaketra (Jaketra) baai, in depths of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$), sand and clay; the bottom here rises gradually to a sandy beach, where there are some warehouses, and there is a landing pier for boats. Konjelan (Kongilang), an islet, 138 feet ($42^{m}1$) high, lies about 3½ cables westward of the southern entrance point of Djaketra baai, and Karangmalang, an islet, 135 feet ($41^{m}1$) high, lies about 3 cables southward of Konjelan; both these islets are fringed by reefs, and vessels should not attempt to pass between them and the coast eastward.

Chart 941a.

Chart 932, plan of Pangul bay.

Off-lying islets.—Djaran (Selu Jaran), a low, rocky islet, lies about one mile offshore and about 1¾ miles southward of Karangmalang; a group of rocks, sometimes covered, but usually marked by breakers, lies about 3½ cables southward of Djaran. Teang, a group of islets or rocks, lies about 1½ miles eastward of Djaran.

Chart 1653b.

Prendjana (Prenjana) and Panehan are two rocky islets about 4 and 5½ miles south-eastward of Djaran, respectively, and are very prominent. Owing to the lack of soundings, caution should be exercised in this vicinity.

Coast.—Soembreng (Sumbreng) baai, entered about 6 miles east-south-eastward of Panggoel baai, is free from dangers, except for some rocks and islets extending nearly three-quarters of a mile south-westward from the eastern entrance point. The shores on either side of the bay consist of steep, rocky cliffs, and at the head is a sandy beach, 2 miles long, on which the surf always breaks heavily. A small river flows out at each end of this beach; the western is accessible for boats, the eastern is practicable but dangerous.

The coast between Soembreng baai and the entrance to Segoro Wedi baai, about 10 miles eastward, is rocky, and indented by several bays, the largest of which are Ampiran (*Lat. 8° 20′ S., Long. 111° 36′ E.*) and Doekoeh (Dukuh), but neither of them affords suitable anchorage. As this coast has not been thoroughly examined, it should be given a wide berth.

Chart 932, plan of Segoro Wedi bay.

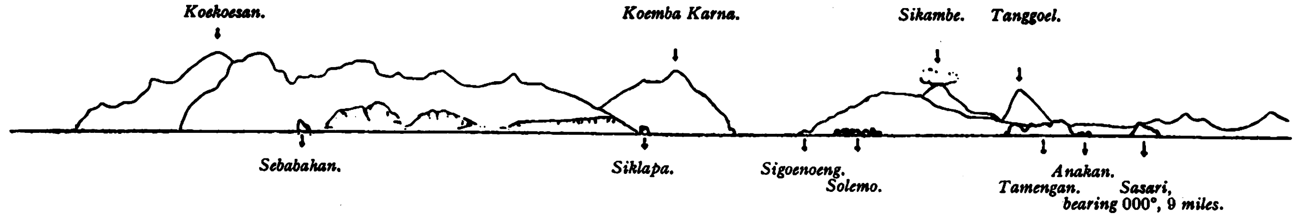
Segoro Wedi baai.—Segoro Wedi baai, backed by high mountains, is the clearest and safest bay on the south coast of Java, and has good holding ground of clay; it is, however, difficult of access by land, and is, therefore, of no importance as an outlet for trade. The entrance between Siklapa (Kelapa) and Sigoenoeng (Gunong), about 1½ miles north-eastward, is deep in the fairway, whence the depths decrease regularly to 4 fathoms (7^{m}3) near the head. Siklapa lies on a reef extending about 3 cables south-eastward from Ujong Siklapa, the south-western entrance point of the bay, and Sigoenoeng lies on the outer part of a reef extending 8½ cables south-westward from Tanjong Sisroei, the north-eastern entrance point.

Outside the bay, within 3 miles of the coast, are several islets, rising steeply from the sea. Tanggoel (Tanggul) (chart 1653b), 2,162 feet (659^{m}0) high, about 4¾ miles north-north-eastward of the bay, and shaped like a haycock, is very prominent. *See* views on plan, and facing this page.

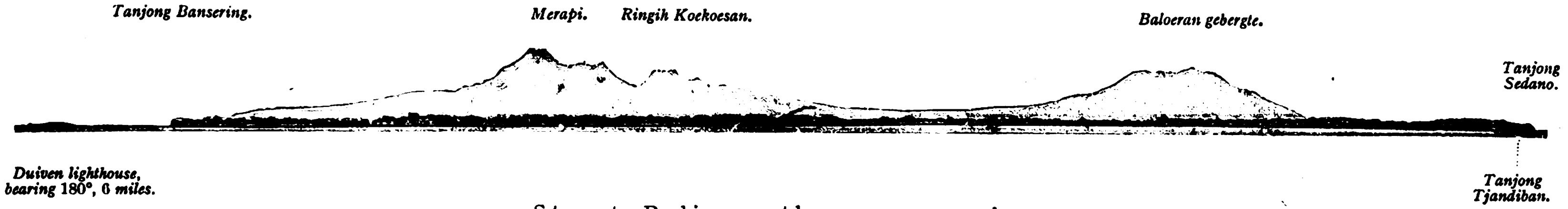
Off-lying islets and dangers.—Klompok (Nglompoh) lies about 3½ miles westward of Ujong Siklapa and about half a mile offshore. A dangerous rock, with a depth of less than 6 feet (1^{m}8) over it, lies about one mile southward of Klompok. In 1900, a rock above water was observed between Klompok and the coast; a reef, with a depth of less than 3 fathoms (5^{m}5) over it and marked by heavy breakers, was also seen 1½ miles south-eastward of Klompok, with the northern extremity of that islet in line with the south-eastern extremity of Doekoeh baai (chart 1653b), bearing 310°. This area should be avoided, as other dangers may exist.

Sebabahan (Babaan) or Babadan, about 2 miles south-south-westward of Ujong Siklapa, are two high needle rocks standing on a reef,

To face page 164.



Java, south coast. Approach to Segoro Wedi baai.
(*Original dated* 1931.)



Straat Bali, northern approach.
(*Original dated* 1903.)

Chart 932, plan of Segoro Wedi bay.

which dries, extending one cable northward from the rocks, and are usually marked by heavy breakers. Sekel (Skel), about 4 cables southward of Sebabahan, is a rock always above water except with exceptionally high water, and is usually marked by heavy surf.

Batang, about 1¾ miles south-eastward of Ujong Siklapa, is a rock similar to Sekel. Solima (Solemo) or Nusa Lima, consists of five rocky thickly wooded islets, lying about 6 cables eastward of Batang.

Bajalangoe (Bayalangu), Tamengan (Tamingan), 391 feet ($119^{m}2$) high, and Anakan, are a group of rocky islets, thickly wooded, lying about 3 miles eastward of Ujong Siklapa. A rock, with a depth of 3½ fathoms ($6^{m}4$) over it, was reported, in 1838, to lie about midway between Tamengan (*Lat. 8° 22′ S., Long. 111° 47′ E.*) and Tanjong Sisroei; no trace of this rock has, however, been found in subsequent examinations, although a coral patch, with a depth of 9 fathoms ($16^{m}5$), was found nearly 1¼ miles north-westward of Tamengan. Sasari (Sosori), 7½ cables east-north-eastward of Anakan, is a rocky islet, 423 feet ($128^{m}9$) high.

Anchorages.—There is sheltered anchorage in Labuan Gangsa (Gongso bight), on the eastern side of Segoro Wedi baai, in a depth of 14 fathoms ($25^{m}6$), mud and clay, off Pager Goenoeng (Gunung) village; some rocks above water extend about 2 cables offshore about 2½ cables north-north-westward of the village. Ngrembeng, a conical islet, lies near the coast about one mile south-westward of the village.

There is anchorage in the eastern part of Labuan Prigi, at the head of the bay, in depths of from 3 to 6 fathoms ($5^{m}5$ to $11^{m}0$), as close inshore as possible, off the pier at Ketawang village; this anchorage is sheltered from southerly and easterly winds, and landing can be easily effected. There is a pier with a warehouse at its root southward of Ketawang.

Anchorage in Labuan Damas, and elsewhere on the western side of the bay, is not safe.

Vessels entering Segoro Wedi baai should avoid all suspicious areas, the recommended route being that between the Solima and Tamengan groups. Sounding gives no warning of the approach to dangers.

Tidal streams.—There is very little tidal stream inside Segoro Wedi baai. During the survey, in July and October, 1839, the rate inside and outside the bay was only a half to one knot; in the latter part of September, however, a stream setting eastward at a rate of 2½ knots was observed near Sekel.

Chart 1653b.

Coast.—Gemah baai, immediately eastward of Segoro Wedi baai, contains no known dangers, except for the reef extending about 3 cables from Tanjong Wot Djaloe (Jalu), the western entrance point, situated about 2 miles north-eastward of Tanjong Sisroei. The entrance to the bay is deep, whence the depths decrease gradually to 20 fathoms ($36^{m}6$) abreast Tanjong Lemiring, a narrow promontory on the north-eastern side of the bay, 3½ miles north-eastward of Tanjong Wot Djaloe, and thence to 7 fathoms ($12^{m}8$) near the head of the bay.

There is good anchorage off Popoh village, close northward of Tanjong Lemiring, in a depth of about 6 fathoms ($11^{m}0$), the depths decreasing gradually; Tanjong Lemiring is steep-to and rocky, with depths of from 6 to 10 fathoms ($11^{m}0$ to $18^{m}3$) close to. The northern

Chart 941a.

Chart 1653b.

and western sides of the bay are unsafe during the east monsoon, and even the above anchorage is not always safe at that season. Tanggoel (page 164) is a good mark for entering the bay. A few fresh provisions can be obtained at Popoh village. Gemah baai is seldom visited by vessels, although the interior is easier of access than from the neighbouring bays, as the northern side is only bounded by a ridge, from about 300 to 400 feet ($91^{m}4$ to $121^{m}9$) high, and about 2 miles wide. Eastward of Tanggoel there are three lower peaks, the easternmost of which is Teras, 1,483 feet ($452^{m}0$) high.

Boemboen (Bumbun) baai, close eastward of Gemah baai, is calm only with easterly winds. The entrance is deep, whence it shoals gradually to 3 fathoms ($5^{m}5$) near the head of the bay. Tanjong Pakis (*Lat. 8° 18′ S., Long. 111° 54′ E.*), the eastern entrance point, is steep and rocky.

Sempoe (Sempu), about 47 miles eastward of Tanjong Pakis, is a rocky desolate island separated from the coast by a channel about one cable wide with a least depth of about 5½ fathoms ($10^{m}1$) in its eastern entrance, but there is a reef, which dries, lying about 1¼ miles eastward of the north-eastern extremity of Sempoe. Vessels with local knowledge may obtain a safe anchorage off the north-western side of the island by proceeding through the channel from eastward. There is a pier here, with depths of from 16 to 23 feet ($4^{m}9$ to $7^{m}0$) alongside. The southern side of the island, like the entire coast between Tanjong Pakis and Sempoe, is inaccessible.

Chart 1653c.

Within a distance of about 12 miles eastward of Sempoe are the three small bays, Tambakan, Lengkosono, and Pletot, but little is known of them. Thence to Tanjong Pelindoe (Pelindu), a low point about 29 miles eastward, the coast forms a bight, at the head of which, and 12½ miles north-eastward of Pletot baai, is Dampar baai, but it has not been examined; the western part of this bight is rocky, and dangerous reefs are reported to extend some distance offshore; the eastern part of the bight has a sandy beach, backed by sand-hills. On the western side of Dampar baai is a mass of rock, 332 feet ($101^{m}2$) high, which is noticeable to a vessel when near the coast. The volcano Smeroe, about 14 miles north-westward of Dampar baai, is a good landmark. *See* page 124.

Baroeng (Barung), about 3 miles southward of Tanjong Pelindoe, is a moderately high, rocky island, and is uninhabited. The north coast of the island is not so steep as the other sides, and there is a small bay here affording sheltered anchorage, in a depth of about 27 fathoms ($49^{m}4$); without local knowledge, however, it is advisable not to approach within at least one mile of the island, as unknown dangers may exist. The channel between the island and Tanjong Pelindoe is deep in the fairway.

Baai van Poeger Koelon (Pugur Kulon), northward of the eastern extremity of Baroeng, affords moderately good anchorage, and landing can be effected under favourable conditions. On the northern shore is a sandy beach, and the eastern side of the bay rises steeply to the summit of Watangan, 1,605 feet ($489^{m}2$) high. Poeger Koelon (Pugur Kulon) village is situated near the mouth of a river, navigable for praus, which flows into the north-eastern corner of the bay; this hamlet is the terminus of a branch line of the railway system, and is also

Chart 941a.

Chart 1653c.

connected with the general telegraph system. Provisions and water can be obtained in moderate quantities.

The coast between the eastern entrance point of Baai van Poeger Koelon and Bandi Alit baai, about 13½ miles east-south-eastward, has not been examined recently; except for the rocky islets Awoe (Awu), Pager, Djali (Jali), and Pisang, which all lie within 2 miles of the coast, and some rocks lying close under the coast, there are no known dangers.

A further examination has been made of the almost uninhabited coast eastward of the above islets, including the bays Bandi Alit, Permisan, and Radjeg (Rajeg) Wesi, which lie within a distance of 15 miles eastward of Bandi Alit eilandje (*see* below), but they have not been accurately surveyed yet.

Aspect.—The following prominent mountains and hills lie near the coast:—Rika gebergte, on the western side of Bandi Alit baai, is a continuation of the high, desolate land in the interior, and has several prominent peaks near the coast, the highest being Rika, 1,775 feet ($541^{m}0$) high, situated about 17 miles east-south-eastward of Tanjong Pelindoe (*Lat. 8° 24′ S., Long. 113° 24′ E.*). Mandeng gebergte, rising to an elevation of 2,192 feet ($668^{m}1$), lies between Bandi Alit baai and Meroe (Meru) baai, and a ridge runs in a south-westerly direction to the steep eastern entrance point of Bandi Alit baai; about 1½ miles eastward of this point is a somewhat isolated mountain, close to the coast, 1,050 feet ($320^{m}0$) high.

A ridge runs in a north and south direction along the tongue of land separating Meroe baai and Permisan baai; its highest peak, westward of the head of Permisan baai, has an elevation of 1,116 feet ($340^{m}2$). Permisan, on the eastern side of Permisan baai, is 1,860 feet ($566^{m}9$) high and prominent.

Djagatambé, 1,145 feet ($349^{m}0$) high, is situated on the tongue of land on the eastern side of the entrance to Radjeg Wesi baai, and, about 1½ miles north-eastward of it is Karang Tambak. Toempang Pitoe (Tumpang Pitu), 1,601 feet ($488^{m}0$) high, is situated on the eastern side of the bay eastward of Radjeg Wesi baai and about 5½ miles south-eastward of Karang Tambak.

Islets and dangers.—The following are the principal islets and known dangers off this part of the coast:—Bandi Alit, a steep rocky islet with a noticeable needle-shaped peak on its eastern end, lies about 3 cables southward of the eastern entrance point of Bandi Alit baai; a large and a small group of rocks lie off the west point of the islet, and a rock which covers at high water, marked by surf, was observed about half a mile north-eastward of the eastern extremity.

Singa, a high, rocky islet, with two lower rocky islets off its south-western extremity, lies about 2 miles east-south-eastward of Bandi Alit. A group of rocks lies close off the western entrance point of Permisan baai. Kalong, a noticeable islet with a small peak in the southern part, lies close off the western entrance point of Radjeg Wesi baai; an isolated group of rocks lies about one mile offshore and 2½ miles westward of Kalong, and there are numerous dangerous rocks extending westward from the island.

Moestaka (Mustaka), one mile offshore and about 7½ miles south-eastward of Kalong, is a long, narrow, rocky islet; about 1½ miles eastward and 3¾ miles east-north-eastward of Moestaka, respectively,

Charts 941b, 2759a.

Chart 1653c.

are the two rocky islets Lotoeng (Lotung) and Karang Bolong, lying close offshore. A rock, which dries, lies one mile south-south-eastward of Lotoeng.

The examination of this part of the coast was in the nature of a running survey, and other dangers may exist; no vessel should attempt to pass between any of the above islands and the coast. During the examination the vessel steamed along the following route, where the depths varied between 40 and 100 fathoms ($73^{m}1$ and $182^{m}9$) :—From a position about one mile southward of Moestaka a north-westerly course was steered to pass 1½ miles southward of Kalong, and thence one mile southward of the isolated rocks lying 2½ miles westward of that island, and the same distance southward of Singa and Bandi Alit eilandjes, to a position about 2 miles southward of Pisang (*Lat. 8° 30′ S., Long. 113° 40′ E.*).

Bandi Alit baai.—The eastern and western shores of this bay are rocky, the northern shore is sandy. A steep rock, white in parts, lies close off the western entrance point, and just northward of the middle of the eastern side of the bay is a detached reef, which dries, with some rocky islets on it; elsewhere the bay is clear, except for a few scattered rocks close under the steep shore.

The fairway in the entrance is deep, and the depths decrease regularly inside. Northward and north-north-eastward of the islets mentioned above there is a bank, with depths of from 14 to 16 fathoms ($25^{m}6$ to $29^{m}3$), sand, over it. In the north-western part of the bay there is a slight indentation, where the depths decrease gradually from 11 to 3 fathoms ($20^{m}1$ to $5^{m}5$); a rock, which dries, lies nearly half a cable off the rocky point on the south-western side of this inlet. There is safe anchorage here, almost free from swell, with the western rock off Bandi Alit eilandje in line with the rocky point, bearing 181°; the holding ground of grey sand with broken shells, is good. A road leads from here to the Bandi Alit plantation, situated farther inland; landing elsewhere in the bay is almost impossible owing to surf.

Permisan baai.—The entrance to this bay is clearly defined by the high shores on either side. A group of rocks lies off the western entrance point, and within the entrance is a small, rocky islet, whilst two more islets lie close to the eastern shore. A rock, which dries, lies about 1½ cables off Tanjong Klapagowok, the eastern entrance point, and there are rocks close under this point. The eastern and western shores of the bay are rocky, the northern shore being bordered by a sandy beach.

The depths decrease gradually from 27 fathoms ($49^{m}4$) in the fairway at the entrance to 11 fathoms ($20^{m}1$) near the first-mentioned rocky islet, eastward of which is a bank, with depths of about 9 fathoms ($16^{m}5$) over it. Near the two islets off the eastern shore is a cove with a sandy beach, which affords a calm and safe landing place at all times; the warehouse of the Permisan plantation is situated here. The best anchorage, more or less sheltered from the swell running into the bay, is in a depth of about 6 fathoms ($11^{m}0$), white sand and good holding ground, with the western extremity of the northern of the two islets bearing 005°, distant about 1½ cables, and the warehouse, 065°.

Radjeg Wesi baai.—The depths in the entrance to this bay, between Kalong and the high promontory on the eastern side, are about 25 fathoms ($45^{m}7$) in the fairway, decreasing gradually inside to

Charts 941b, 2759a.

Chart 1653c.

about 17 fathoms (31^{m}1) in the middle of the bay. The 5-fathom (9^{m}1) line runs close to the shores, and there are no dangers outside depths of 3 fathoms (5^{m}5). Kali Karangtambak flows into the head of the bay.

The south-eastern part of Radjeg Wesi baai, northward of the high promontory forming the eastern entrance point, is known as Pantjamaja baai, where there is a small village named Pondok Pantjamaja. A narrow reef, which dries, extends from the shore by this village, and there are rocks within the 3-fathom (5^{m}5) line, which lies about one cable offshore; a 5-fathom (9^{m}1) patch lies nearly half a mile north-north-westward of the village, otherwise there is a clear space, with an average depth of about 8 fathoms (14^{m}6), for anchoring, more or less sheltered from the swell. A small channel through the reef leads to the short stretch of beach off the village.

Anchorage may also be obtained off Pondok Radjeg Wesi, a village in a bight westward of the mouth of Kali Karangtambak, in depths of from 11 to 14 fathoms (20^{m}1 to 25^{m}6), but it is exposed to the swell; landing can be effected at most times, but only through a heavy surf. A footpath leads in a north-westerly direction from the village to the Soekamadé plantation.

The bay northward of Moestaka has not been examined; there are two islets in it, one of them named Merah, and a group of rocks lies off the western entrance point.

Chart 2732, plan of Grajagan bay.

Gradjagan baai.—Gradjagan (Grajagan) baai, entered between Tanjong Tjapil (Chapil), about 10 miles eastward of Toempang Pitoe, and Tanjong Poerwa (Purwa), a low point 9 miles south-eastward, affords tolerably good anchorage in the east monsoon, in depths of from 8 to 14 fathoms (14^{m}6 to 25^{m}6). Tanjong Tjapil (*Lat. 8° 38′ S., Long. 114° 14′ E.*) rises abruptly to Dogong, a hill, 1,257 feet (383^{m}2) high; the rocky islet Watoe (Watu) Lajar (chart 3726), 63 feet (19^{m}2) high, lies about 1¼ miles south-westward of the point and about three-quarters of a mile offshore.

Gradjagan (Grajagan) village is situated in the north-western corner of the bay, at the mouth of Segara Anak, which runs parallel with the northern shore of the bay for some distance; landing is difficult when there is the least surf.

Chart 3726.

Schiereiland Blambangan.—Light.—Schiereiland Blambangan, eastward of Gradjagan baai, forms the south-eastern extremity of Java; it rises to an elevation of 1,181 feet (360^{m}0) and is covered with a monotonous undergrowth, affording no noticeable features. The southern and eastern coasts are fringed by a narrow reef, which dries, on which there is a heavy surf even with a very calm sea. Batu Mandi lies near the coast about 3¾ miles eastward of Tanjong Poerwa, and there is a noticeable wreck on the edge of the coastal reef off Tanjong Slokah, the eastern extremity of the peninsula.

A light is exhibited, at an elevation of 250 feet (76^{m}2), from a white iron framework structure, 69 feet (21^{m}0) in height, situated near Tanjong Bantenan, the southern extremity of Schiereiland Blambangan.

There are four openings in the coastal reef on the south coast of the peninsula, where landing can be effected without difficulty in both

Charts 941b, 2759a.

monsoons; according to the local fishermen, however, landing is impracticable at these places during five days in each month, this phenomenon being named by them "Ayer Rusak."

STRAAT BALI.—Straat Bali, separating Bali eiland from the eastern end of Java, is seldom used except for local traffic. Tjilatjap, on the south coast of Java, is usually approached from Sunda strait. The main steamship routes from Australia to China and Japan, and *vice versa*, are through Straat Lombok and Macassar strait.

Owing to the fact that the high peaks of Bali are seldom visible during the east monsoon on account of the hazy atmosphere, care should be taken, when uncertain of the vessel's position, not to mistake Straat Badoeng (page 192) for Straat Bali, as, from southward, Tafelhoek peninsula (*Lat. 8° 49′ S., Long. 115° 10′ E.*) bears some resemblance to Schiereiland Blambangan.

During the east monsoon the wind is mostly from south-south-west and south-south-east to south-east, with a west-going current; from July to September the wind can be very strong. In the west monsoon, a vessel may be set strongly eastward, both by wind and current.

Currents and tidal streams.—The character of the tidal streams in Straat Bali is semi-diurnal; the direction is affected by the monsoon, the east monsoon causing a constant current southward, and the west monsoon northward. The resultant stream due to the combined working of the tides and monsoons is as follows:—

In the Narrows, during the east monsoon (May to August inclusive), the stream flows nearly constantly southward, and is strongest about 5 hours after the moon's upper and lower transit, with a maximum rate of from 6 to 7 knots. From about 3 hours before until the moon's transit a weaker stream sets northward with a maximum rate of 3½ knots, although this may be replaced by an inconstant stream or even by a weak south-going stream with a maximum rate of 2 knots.

During the west monsoon (November to February inclusive) the north-going stream is the stronger, and flows for about 8 hours, from about 6 hours before to 2 hours after the moon's upper and lower transit; the maximum rate, from 6 to 7 knots, occurs about 3 hours before the moon's upper and lower transit. During the other periods there is a south-going stream.

During the transition months between the monsoons the rate of either the north-going or south-going streams does not exceed 5½ knots; the north-going stream runs from about 4½ hours before to 2½ hours after the moon's upper and lower transit, and the south-going stream during the remainder of the period.

As a general rule, the strongest streams may be expected in the first week after full or new moon. During neap tides (first week after the quarters) the rate never exceeds 3 knots.

Near Tanjong Semboeloengan (page 171), the stream starts from about 2 to 2½ hours earlier than in the Narrows; near Banjoewangi (page 174) from one to 1½ hours earlier; and near Duiven eiland from one to 2 hours later. In the broader part of the strait the tidal stream usually is later than close to the coast, and the maximum rate increases regularly as the Narrows are approached. Under the north coast of Bali, eastward of Tanjong Pasir, when the north-going stream is

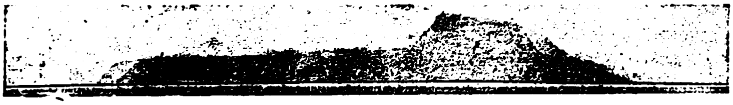
Chart 3726.

running through the strait there is an eddy or the stream is inappreciable.

Western side of southern part of Straat Bali.—Coast.—The east coast of Java, forming the western side of Straat Bali, is fringed by a narrow reef in the southern part, between Tanjong Slokah and Tanjong Semboeloengan (Sembulungan), about 20 miles north-westward, with considerable depths close outside it. Banjoe Biroe (Banju Biru) baai, about midway between these two points, affords anchorage in a depth of about 20 fathoms ($36^{m}6$).

Chart 2732, plan of Pangpang bay.

Tanjong Semboeloengan (*Lat. 8° 27′ S., Long. 114° 23′ E.*) is the northern extremity of a high peninsula forming the eastern side of Pangpang baai, and may be identified by Ikan, a hill with a flat summit, 763 feet ($232^{m}6$) high, rising just within the point.



Ikan, bearing 185°.

(*Original dated* 1903.)

Pangpang baai affords sheltered anchorage at all times. The eastern shore is fringed by a steep-to coral reef and a sandy beach; the western and southern shores are fringed by a mudbank which partly dries occupying a great portion of the bay. The depths decrease gradually from 10 fathoms ($18^{m}3$) in the fairway at the entrance to 3 fathoms ($5^{m}5$) about 3 miles within.

There is a jetty, extending about 2 cables from the shore, about one mile southward of Tanjong Semboeloengan and there are two jetties on the western shore, situated close together about 2¾ miles west-north-westward of the same point.

Chart 3726.

Off-lying shoal.—Prince of Orange bank, about 8 miles northward of Tanjong Slokah and nearly in the middle of the southern entrance to Straat Bali, has a least depth of 6 fathoms ($11^{m}0$) over it, and is not marked by discoloration.

Eastern side of southern part of Straat Bali.—Coast.—Tafelhoek or Bukit, the peninsula forming the southern extremity of Bali, is joined to the remainder of that island by a low isthmus, and although it rises to an elevation of 709 feet ($216^{m}1$), it appears lower than it actually is in comparison with the high mountains in the northern part of Bali. The southern coast of the peninsula is steep for the greater part, although in some places there is a sandy beach at the foot of the cliffs; a coastal reef, which dries, extends for a distance of not more than 4 cables, and, except for some rocks close under the coast, there are no dangers.

The two summits of Tafelhoek shown on the chart, 709 feet ($216^{m}1$) and 517 feet ($157^{m}6$) high, respectively, are not particularly noticeable, except for a double round-topped tree on the lower of the two; there is also a tall tree, with a white, straight trunk, on the southern slope. On Tanjong Meboeloe (Mebulu), the western extremity of the

Charts 1653c, 941b, 2759a.

Chart 3726.

peninsula, is a white temple, standing at an elevation of 256 feet ($78^{m}0$), and about three-quarters of a mile eastward of the point is a wooded hummock, 487 feet ($148^{m}4$) high.

The general description of Bali eiland, together with that of its northern and south-eastern coasts, are described on pages 179-191.

Chart 3726, with plan of Pantai Barat.

Pantai Barat.—Pantai Barat, the large bight formed between Tanjong Meboeloe and Tanjong Tandjoengan (Tanjungan), about 11 miles northward, is divided into two parts by a reef which extends about 8 cables from the western side of the low peninsula connecting Tafelhoek with the remainder of Bali; the southern of these is named Labuan Djimbaran (Jimbaran), and the northern Labuan Koeta (Kuta). The following are prominent landmarks: a round-topped tree with a white trunk on Tanjong Beding (*Lat. 8° 49′ S., Long. 115° 06′ E.*), the western entrance point of Labuan Sait, 1½ miles north-eastward of Tanjong Meboeloe, used as a landing place for praus; two round-topped trees near Kedoenganan (Kedunganan), on the isthmus between Tafelhoek and the main part of Bali; an open round-topped tree near Koeta, in the southern part of Labuan Koeta; and two round-topped trees about 2 miles northward of Koeta. Tanjong Tandjoengan is very steep, and may be identified by a small white temple on one of the rocks lying on the reef, which dries, extending about 4 cables from the point; some of these rocks are about 50 feet ($15^{m}2$) high; there is also a temple on a low, rocky point, about 2 miles south-eastward of Tanjong Tandjoengan.

Tanjong Tangoema lies about 9 cables northward of Tanjong Meboeloe, and Tanjong Batoe Poenggal (Batu Punggal), about 2 miles north-eastward of Tanjong Tangoema.

Pantai Barat is only comparatively free from sea and swell during the transition periods between the monsoons. Labuan Djimbaran affords anchorage, in a depth of 5 fathoms ($9^{m}1$), hard sand, with the double round-topped tree on the 517-foot ($157^{m}6$) high summit of Tafelhoek in line with a group of trees with straight white trunks on the beach, bearing 152°, and a rock on the coastal reef off Tanjong Tangoema, bearing about 234°, well open of Tanjong Batoe Poenggal; it is not advisable to go closer in on account of the heavy rollers inside the 3-fathom ($5^{m}5$) line.

In Labuan Koeta vessels can anchor close off the road leading to Koeta village. In the southern part of the bay there is a reef with a depth of 2¼ fathoms ($4^{m}1$) over it; from this reef a ridge, with a least depth of 3 fathoms ($5^{m}5$) over it, extends about 1½ miles northward, with depths of from 5 to 6½ fathoms ($9^{m}1$ to $11^{m}9$) inside it.

Chart 3726.

Coast.—Dangers.—The greater portion of the coast between Tanjong Tandjoengan and Tanjong Pengambengan, nearly 34 miles north-westward, is flat, with a low plain extending to the foot of the mountains in the northern part of Bali, although in places low spurs run down close to the sea. The south-eastern part of this coast, as far as Reede Poeloekan (Pulukan), is fringed by a reef, broken in places by sandy beaches; there are no dangers outside the 10-fathom ($18^{m}3$) line. Several rivers flow out along this coast, but none of them is of any importance; Sungei Djembrana (Jembrana), which flows out by Tanjong Prantjak (Pranchak), about 1¼ miles eastward of

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Chart 3726.

Tanjong Pengambengan, is navigable for praus; about 2¼ miles eastward of Tanjong Prantjak the white temple with a red roof in Prantjak village is noticeable.

Chart 3726, plan of Pulukan road.

Off the mouth of the Sungei Poeloekan, 13½ miles eastward of Tanjong Pengambengan, there is a break in the coastal reef which affords the only good landing place along the whole of the south-west coast of Bali when there is any swell. A reef, which partly dries, lies about 2 miles west-north-westward of the mouth of Sungei Poeloekan, and about three-quarters of a mile farther westward is a 1¾-fathom ($3^{m}2$) patch.

Chart 3726.

Southern part of Straat Bali.—Coast.—Light.—The Java coast between Pangpang baai (page 171) and Tanjong Pakem (*Lat. 8° 14′ S., Long. 114° 24′ E.*), 13½ miles northward, is thickly wooded as far as Boentoe (Buntu) village, situated about 3½ miles southward of Tanjong Pakem, with a few open spaces such as by Bomo village, about 5½ miles farther southward, a few houses of which are visible from seaward. Northward of Boentoe village the coast is bordered by a sandy strip and is marshy in places.

A light is exhibited, at an elevation of 102 feet ($31^{m}1$), from a white iron framework structure, 108 feet ($32^{m}9$) in height, on Tanjong Pengambengan. In 1945, the light was extinguished.

Tanjong Paboeanan (Pabuanan), about 5½ miles north-westward of Tanjong Pengambengan, is a long, narrow tongue of land, difficult to distinguish from the land behind; inside the point is a lagoon with some islets in it. Tjandi Kesoema (Chandi Kesuma) village, about 1½ miles northward of Tanjong Paboeanan, is surrounded by an extensive coconut plantation, visible from a distance of from 4 to 6 miles.

Dangers.—Beacon.—A 9-fathom ($16^{m}5$) bank lies about one mile south-westward of Tanjong Paboeanan. A reef, with a depth of 1¾ fathoms ($3^{m}2$) over it, lies about 2 miles north-westward of the same point and nearly one mile offshore.

An 8-fathom ($14^{m}6$) bank lies about 2½ miles eastward of Boentoe village. Bromo rock, with a depth of 6 fathoms ($11^{m}0$) over it, lies about 2¼ miles south-south-eastward of Tanjong Pakem. A reef, with a depth of 2½ fathoms ($4^{m}6$) over it, lies about 7 cables offshore and one mile southward of Tanjong Pakem; it is marked by a black beacon surmounted by a truncated cone.

Chart 3726, Bali strait, with plan of Chupel road.

Anchorages.—Beacons.—Dangers.—Reede Tjoepel (Chupel), off the mouth of a small river which flows out nearly 2 miles north-westward of Tanjong Pengambengan, affords anchorage, in a depth of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$), about three-quarters of a mile offshore. A rock, with a depth of 3 feet ($0^{m}9$) over it, lies about 1¾ miles north-westward of the light-structure on Tanjong Pengambengan and about 5½ cables offshore; foul ground extends about 6 cables westward and 7½ cables north-westward from the mouth of the river at Tjoepel. There is a small wooden landing pier at Tjoepel, but the approach to it is foul; there is a prominent warehouse on the northern side of the river.

Reede Tjandi Kesoema, close northward of Tanjong Paloeanan, affords anchorage, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), with

Charts 1653c, 941b, 2759a.

Chart 3726, Bali strait, with plan of Chupel road.

a white pyramid, 43 feet ($13^{m}1$) in height, situated on a hillock near the beach, bearing 034°; in 1934, however, a vessel passing close to Tjandi Kesoema reported that this pyramid was not visible. Vessels making for this anchorage should take care to avoid the 1¾-fathom ($3^{m}2$) reef lying about one mile south-westward of the pyramid. Tjandi Kesoema village is connected by road with Negara village, about 6½ miles south-eastward, the headquarters of the Government official of the Djembrana district.

Prohibited anchorage.—Anchoring and fishing are prohibited, due to the existence of submarine cables, within an area, indicated by pecked lines on the chart, extending about 2¾ miles from the coast between the white pyramid at Tjandi Kesoema (*Lat. 8° 18′ S., Long. 114° 31′ E.*) and a position on the coast about 2¾ miles north-westward.

Chart 3726, plan of Banyuwangi road.

Reede Banjoewangi.—Lights.—Reede Banjoewangi (Banyuwangi) is bounded by lines drawn in the directions 292½° and 225° from Ommen droogte and De Groot's klip beacons (*see* below), respectively, and by a line joining these two beacons.

The town of Banjoewangi (Banyuwangi), the capital of the district of that name and the headquarters of a Government official, is situated about 1½ miles northward of Tanjong Pakem. The surrounding district is well cultivated, and the roadstead is the shipping place of the various products, such as coffee, sugar, and tobacco. The climate is said to be hot and unhealthy owing to the town being shut in by lofty mountains inland, but during the east monsoon the temperature is lower and the nights comparatively cool.

The roadstead is divided into an outer and inner road by Nieuw bank (New bank) and the dangers northward of it. The outer road, between Ommen droogte and Nieuw bank, affords good anchorage for large vessels, in depths of from 11 to 13 fathoms ($20^{m}1$ to $23^{m}8$); during the west monsoon there is seldom any sea, and communication with the shore can always be maintained. The depths in the inner road vary from 4 to 7 fathoms ($7^{m}3$ to $12^{m}8$), and there is only room for a limited number of vessels. It is advisable to moor to avoid a foul anchor.

There is a prau harbour, which can only be entered at or near high water, with a number of wharves for loading and discharging cargo. A small pier extends from the seaward side of the north-eastern part of this harbour; it lies outside the influence of the current, and is used by boats and praus.

A light is exhibited, at an elevation of 46 feet ($14^{m}0$), from a white iron framework structure, 46 feet ($14^{m}0$) in height, situated close eastward of the Harbour office, on the eastern side of the prau harbour.

A light is exhibited, at an elevation of 24 feet ($7^{m}3$), from a white iron framework structure, 19 feet ($5^{m}8$) in height, situated on the beach about 2 cables southward of the above-mentioned light.

There is a steel tower on the coast about 4 cables southward of the southern light-structure.

Dangers.—Buoy and beacons.—De Groot's klip, with a depth of 2¾ fathoms ($5^{m}0$) over it, lies about 5½ cables south-eastward of the southern light-structure, and is marked by a black beacon surmounted by a truncated cone.

Krokodil (Crocodile) rif, with a depth of 2¾ fathoms ($5^{m}0$) over it,

Charts 1653c, 941b, 2759a.

Chart 3726, plan of Banyuwangi road.

and marked by a black beacon surmounted by two truncated cones, lies about 2¼ cables south-eastward of the southern light-structure.

Ommen droogte, a coral patch with a least depth of 2¾ fathoms (5^{m}0) over it, and marked by a black iron beacon with a reflector, surmounted by a truncated cone, lies 8½ cables east-north-eastward of the northern light-structure. A 3¾-fathom (6^{m}9) patch lies about three-quarters of a cable north-westward of the beacon (*Lat. 6° 12′ S., Long. 114° 24′ E.*).

Nieuw bank, with a least depth of 3¾ fathoms (6^{m}9) over it, lies about 2 cables eastward of the northern light-structure. Between Nieuw bank and Krokodil rif there is a shoal, with a least depth of 3¾ fathoms (6^{m}9) over it. Deptford rock, with a least depth of 1½ fathoms (2^{m}7) over it, lies about 3½ cables north-eastward of the northern light-structure.

A shoal, with a least depth of 1¼ fathoms (2^{m}3) over it, lies close northward of Deptford rock; its northern extremity, situated about 7 cables north-north-eastward of the northern light-structure, is marked by a white conical buoy, but it was reported missing in 1948. A 2¼-fathom (4^{m}1) patch lies close westward of this shoal, about 5 cables north-north-eastward of the same light-structure.

Two shoals, with depths of 3¼ and 4¼ fathoms (5^{m}9 and 7^{m}8) over them, lie about 4 and 4½ cables, respectively, eastward of Soekawidi (Sukawidi) sugar factory, situated 8 cables northward of the northern light-structure.

North rock, with a depth of 2¾ fathoms (5^{m}0) over it, lies nearly 1¼ miles northward of the northern light-structure, and is marked by a beacon surmounted by two white balls. Half a cable westward of North rock is a shoal with a least depth of 1¼ fathoms (2^{m}3) over it; a beacon surmounted by a white ball stands on its south-eastern side.

Tidal streams.—As the direction of the tidal stream near the Java shore often changes considerably earlier than farther outside (*see* page 170), the tidal stream in the inner road often runs strongly in a contrary direction to that by Ommen droogte and may attain a rate of 2½ knots.

Chart 3726, with plan of Banyuwangi road.

Pilotage.—There is a private pilot service at Banjoewangi, administered by the general agency of the various steamship lines making use of the inner roadstead; there are no regular pilot signals, so arrangements should be made beforehand by telegraph.

Prohibited anchorage.—The southern light-structure at Banjoewangi, bearing 310°, marks the southern limit of the anchorage; owing to telegraph cables anchorage is prohibited in the area, indicated by pecked lines on the chart, extending 3 miles southward of this line. *See* page 14.

Directions.—The town of Banjoewangi is difficult to distinguish in the afternoon when the sun is behind it, but Bakoengan (Bakungan) gebergte, near the western extremity of Bali, is a good mark. The northern light-structure, flagstaff, and the Soekawidi sugar factory are also good landmarks.

When approaching Banjoewangi from southward, care should be taken to pass eastward of the 2½-fathom (4^{m}6) reef, marked by a beacon, lying about one mile southward of Tanjong Pakem (*Lat. 8° 14′ S., Long. 114° 23′ E.*). A vessel making for the inner roadstead should previously determine the direction of the tidal stream by observ-

Charts 1653c, 941b, 2759a.

Chart 3726, with plan of Banyuwangi road.

ing the direction of the vessels lying at anchor there, as the tidal stream in the inner roadstead may be running in the opposite direction to that nearer the middle of the strait. As the fairway in the inner roadstead is narrow, the vessel should always proceed to the anchorage against the stream; with a south-going stream in the inner roadstead she should pass southward of Nieuw bank, and with a north-going stream she should pass northward of the shoal northward of Deptford rock.

To reach the inner roadstead by the southern entrance, between Nieuw bank and the coast, the vessel should steer to pass north-eastward of De Groot's klip and Krokodil rif, and thence between the latter and Nieuw bank; it should, however, be remembered that a 3¾-fathom (6^{m}9) patch lies about midway between Krokodil rif and Nieuw bank. Small vessels can pass between Nieuw bank and Deptford rock (*Lat. 8° 12′ S., Long. 114° 23′ E.*).

To reach the inner roadstead by the northern entrance, the vessel should steer for the chimney of the Soekawidi sugar factory, bearing 267°, until the white conical buoy marking the northern extremity of the 1¼-fathom (2^{m}3) shoal northward of Deptford rock can be rounded, and, passing close westward of it, should proceed southward to the roadstead, passing westward of the 2¼-fathom (4^{m}1) patch lying 5 cables north-north-eastward of the northern light-structure. When rounding the white conical buoy mentioned above, it should be remembered that a 3¼-fathom (5^{m}9) patch lies north-westward of it, and a 4¼-fathom (7^{m}8) patch between them.

A vessel leaving the inner roadstead should always proceed against the stream.

Harbour facilities.—Fresh provisions are plentiful. Fresh water is laid on to the wharves in the prau harbour, but it is not fit for drinking unless first boiled.

There is a hospital.

Banjoewangi is connected by rail and telegraph with the principal places in Java. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij and various European steamship lines.

Chart 3726.

Northern part of Straat Bali.—Lights.—Buoys.—At Ketapang, on the western side of the strait, about 3¾ miles northward of Banjoewangi, is a small harbour, enclosed by two moles, for the use of small local vessels.

A light is exhibited from the head of each mole at Ketapang.

Mana baai, about 5 miles northward of Banjoewangi, affords anchorage, in depths of from 10 to 17 fathoms (18^{m}3 to 31^{m}1), out of the tidal streams but in the eddies. Watoedadal (Watudadal) village, about 2 miles northward of Mana baai, may be identified by a bridge over a creek, with a small house near it. Tanjong Bansering, about 2 miles northward of Watoedadal, is low.

Gili Manoek (Manuk) baai, on the eastern side of the strait, entered about 10 miles north-north-westward of Tjandi Kesoema (page 173), has a very narrow entrance, with a depth of 1¾ fathoms (3^{m}2) in the fairway; two islets, surrounded by an extensive flat of mud and sand, lie in the bay, and the remaining area is so encumbered by shoals that it is of no use to shipping; the southern entrance point of the bay is a low strip of sand with a few coconut trees on it. There are two small

Charts 1653c, 941b, 2759a.

Chart 3726.

piers on the western side of the sand spit, with a depth of 13 feet ($4^{m}0$) alongside; the eastern pier was reported to be in a bad state of repair, in 1947; the western pier is about 160 feet ($48^{m}8$) long.

A conical buoy, painted in red and white vertical stripes, moored off the entrance to Gili Manoek baai, indicates the northern side of the entrance.

Tanjong Pasir, the north-western extremity of Bali, and the eastern entrance point of the Narrows of Straat Bali, is low and fringed by a narrow reef.

A light (*Lat. 8° 06′ S., Long. 114° 26′ E.*) is exhibited, at an elevation of 33 feet ($10^{m}1$), from a white iron beacon, 26 feet ($7^{m}9$) in height, on Tanjong Pasir.

Northern approach to Straat Bali.—Coast.—Dangers.—Lights.—Duiven eilandje, 4 miles north-north-eastward of Tanjong Pasir, is low and covered with brushwood; it is fringed by a steep-to reef which dries, about 2 cables wide. A detached coral patch, with a depth of 5½ fathoms ($10^{m}1$) over it, lies half a mile south-eastward of the islet. The tidal streams in and out of Straat Bali may set strongly on to Duiven eilandje.

A light is exhibited, at an elevation of 53 feet ($16^{m}2$), from a white iron framework structure, 30 feet ($9^{m}1$) in height, situated near the eastern side of Duiven eilandje.

Leading lights are situated on Tanjong Bansering. The front light is exhibited, at an elevation of 47 feet ($14^{m}3$), from a white iron framework structure, 43 feet ($13^{m}1$) in height; the rear light is exhibited, at an elevation of 89 feet ($27^{m}1$), from a similar structure, 65 feet ($19^{m}8$) in height, about 3¼ cables northward of the front light. The above lights in line, bearing 006°, lead through the narrows of Straat Bali.

The Java coast northward of Tanjong Bansering is fringed by a wide reef, several parts of which dry and are covered with vegetation, much resembling islands. This reef gradually narrows northward, and disappears entirely at Tanjong Tjandiban (Chandiban), about 11 miles northward of Tanjong Bansering. *See* view facing page 164.

Badjoelmati (Bajulmati) baai, about 9 miles northward of Tanjong Bansering, affords anchorage, in depths of from 10 to 11 fathoms ($18^{m}3$ to $20^{m}1$), mud, about half a mile offshore, with Pandean, a fishing village on the Kali Badjoelmati (Bajulmati), bearing 230°; there is practically no tidal stream here, and, with favourable circumstances, all the reefs are visible.

Krokodil (Crocodile), a rock, with a depth of 1¾ fathoms ($3^{m}2$) over it, and steep-to, lies about 3½ miles southward of Tanjong Tjandiban and about 2 miles offshore; it is marked by discoloration. There are many detached reefs lying off this part of the coast, but, except for Krokodil, they all lie within one mile of the coast.

Tanjong Tjandiban may be identified by a hillock, 65 feet ($19^{m}8$) high, with two isolated coconut trees and a triangulation pillar on it; from northward, a lower clump of trees is seen on the beach, which appears as an islet, outside the trees on the beach. In case of necessity, anchorage may be obtained about 4 cables eastward of Tanjong Tjandiban, in a depth of 14 fathoms ($25^{m}6$), rock; outside this position the depths increase rapidly.

The coast between Tanjong Tjandiban (*Lat. 7° 53′ S., Long. 114° 28′ E.*) and Tanjong Sedano (page 131), about 4 miles northward, is

Charts 1653c, 941b, 2759a.

Chart 3726.

fringed by a narrow coral reef with several openings in it. Off Tanjong Lanon, about midway between these two points, there is a low islet on the reef, but it is difficult to distinguish from the land behind ; in 1945, a small hut at the southern end of the islet was a good mark. Lanon rif, with a depth of 3 feet (0^{m}9) over it, lies about 2 cables offshore between Tanjong Tjandiban and Tanjong Lanon ; the reef is plainly marked by discoloration and breaks with any swell.

Charts 1653c, 941b, 2759a.

CHAPTER VIII

BALI, LOMBOK AND SOEMBAWA EILANDEN—STRAATEN LOMBOK AND ALAS; PATERNOSTER AND POSTILJON EILANDEN.

Charts 941b, 942a.

WESTERN PART OF KLEINE SOENDA EILANDEN.—Kleine Soenda (Lesser Sunda) eilanden described in this volume include the chain of islands extending for nearly 800 miles eastward of Java, terminating in Timor. The steamship route from Singapore and Java to the north-eastern part of Australia leads along the northern side of these islands, on approximately the parallel of 8° S., and thence through Wètar passage. Vessels from the western part of Australia proceeding to Singapore, or through Macassar strait, generally make use of Straat Lombok, or sometimes Straat Alas.

Climate and weather.—*See* page 17.

Currents and tidal streams.—Except for the strong tidal streams running through the various straits between the islands in the western part of Kleine Soenda eilanden, the horizontal movement of the water is entirely due to the monsoons. It must be remembered, however, that the influence of the tidal streams is felt at a great distance outside these straits, especially on the southern side of the islands; this is especially the case during the first week of the new moon or full moon, and more particularly when this week occurs during a period when the moon's declination is large.

Chart 1653c.

BALI.—Bali, separated from the eastern end of Java by Straat Bali, is traversed throughout its length in an east and west direction by a volcanic range, the apparent continuation of the volcanic ridge running through Java. This range includes some peaks of considerable elevation, such as Batoe Kaoe (Batu Kau) (*Lat. 8° 20′ S., Long. 115° 06′ E.*), 7,707 feet (2,349^{m}1) high, near the middle of the island, and Abang, 7,058 feet (2,151^{m}3) high, and Agoeng (Agung) in the eastern part; Agoeng, known also as Piek van Bali, is 10,184 feet (3,104^{m}1) high, very prominent, and appears as a regular volcanic cone with a crater summit. Spurs from the northern side of this range run down close to the northern and north-eastern coasts of the island, leaving only here and there a narrow strip of flat land; southward of the range the land is flat, or slightly hilly, except for Tafelhoek and a group of mountains close westward of Labuan Amoek (Amuk),

Chart 2759a.

Chart 1653c.

on the south-east coast. The flat part of the island is very fertile, and agriculture is the principal industry of the natives. The population, in 1932, was about 1,100,000. Tigers, water buffalo, deer, wild pigs, and crocodiles abound in the north-western part of Bali.

Except in the western part of the island, the coasts are very exposed, with great depths close to, so that there are few good anchorages; Pantai Timoer (Timur), a very sheltered inlet on the south-east coast, immediately northward of Tafelhoek, has developed into the most important shipping place for the southern part of Bali. The numerous small rivers in the island, which frequently dry in the South-east monsoon, are of no importance for shipping.

Chart 3726.

Northern side of Bali.—The north coast of Bali between Tanjong Pasir (page 177), and Tanjong Boengkoelan (Bunkulan), 44 miles eastward, affords few suitable anchorages, and scarcely one of them is safe during the west monsoon. The western part of this coast, between Tanjong Pasir and Tjeloekan (Chelukan) Bawang, 24 miles eastward, is high and affords good landmarks for vessels approaching Straat Bali; eastward of Tjeloekan Bawang there is a strip of low, prosperous land along the coast as far as Tanjong Boengkoelan, only broken by a ridge of hills running eastward from Temoekoes (Temukus) village, situated about 10 miles eastward of Tjeloekan Bawang, to Piek van Boeleleng (Buleleng), about 10 miles farther eastward.

From Tanjong Pasir a ridge of mountains trends south-eastward, and is divided into two parts by a lower portion in about the middle, having the appearance of two coffins; the north-western of these, 3 miles from the point, is named Randoeng Agoeng (Randung Agung), and the south-eastern, about 2 miles farther, Prapat Agoeng (Agung). Southward of this ridge Bakoengan (Bakungan) gebergte runs parallel with Straat Bali, with few noticeable summits. Close to Tanjong Sendang, about 12 miles eastward of Tanjong Pasir, is a prominent hill, 428 feet ($130^{m}4$) high, and about 4½ miles south-westward of this point is a summit, 1,378 feet ($420^{m}0$) high. From southward of Tanjong Sendang a ridge of mountains runs parallel with, and at some distance from, the north coast; this ridge is irregular in shape and has many inconspicuous summits of almost equal elevation, the most noticeable being Grogak (*Lat. 8° 15′ S., Long. 114° 49′ E.*), 4,732 feet ($1{,}442^{m}4$) high, about 4½ miles southward of Tjeloekan Bawang. On Tanjong Goendoel (Gundul), a steep point, 4½ miles eastward of Tanjong Sendang, is a hill 162 feet ($49^{m}4$) high.

Between Tanjong Poelaki (Pulaki), about 9½ miles eastward of Tanjong Pasir, and Tanjong Goendoel there are several large parts of the coastal reef which dry, and also many detached reefs within the 100-fathom ($182^{m}9$) line, all marked by discoloration; some of these reefs only cover at the highest half-yearly tides, and are overgrown with brushwood. It is advisable to keep outside the 100-fathom ($182^{m}9$) line along this portion of the coast. Other dangers along the north coast of Bali all lie within a distance of 1½ miles from the coast.

Chart 2732, plan of St. Nicolaas, Banjuwedang, and Pegametan bays.

St. Nicolaas baai and approaches.—Dangers.—St. Nicolaas baai lies at the head of a bight entered between Tanjong Bedak, situated 3 miles eastward of Tanjong Pasir, and Tanjong Poelaki. Hertenbeest, an island, 236 feet ($71^{m}9$) high, lies about 8 cables east-

Charts 941b, 2759a.

Chart 2732, plan of St. Nicolaas, Banjuwedang, and Pegametan bays.

ward of Tanjong Bedak. The southern side of the island is steep-to nearly everywhere, but elsewhere the island is fringed by a reef extending about 3 cables from the western side. Anchorage can be obtained by vessels with local knowledge in the channel between Hertenbeest and Bali, and the coastal reefs on either side are plainly marked by discoloration; care should be taken, however, to avoid a 2¾-fathom ($5^{m}0$) patch near the Bali shore in the wider part of the channel, and also a 3¼-fathom ($5^{m}9$) patch about midway between the western extremity of Hertenbeest and the Bali shore. In 1947, it was reported that the coastal reef in the middle of the southern side of the island had extended. A least depth of about 8 fathoms ($14^{m}6$) can be carried through the narrow part of the channel. During the east monsoon there appears to be a constant west-going current through this channel.

An extensive reef extends from the western side of St. Nicolaas baai and there are two detached reefs, with depths of 3 feet ($0^{m}9$) and 1½ fathoms ($2^{m}7$) over them, respectively, in the entrance. A reef which dries, marked by discoloration when covered, lies in the middle of the bay, and there are several reefs, not marked by discoloration, southward of it. There is anchorage, in a depth of 22 fathoms ($40^{m}2$), sand, coral, and stones, about 2 cables eastward of the northern extremity of the reef, which dries, in the middle of the bay; it is inadvisable to anchor farther in owing to the difficulty of turning between the reefs.

The shores of the bay are low. In the south-eastern corner the natives have made a small prau harbour, which dries, with dams of coral rock; the bottom here consists of sand. There are a couple of huts at the head of the bay, and a short distance inland is the small village of Tjeloekan Terima, the red roofs of which are visible from the bay.

Chart 3726.

Tidal streams.—During July and August a constant west-going stream at a rate of from one to 1½ knots, was observed over the bank, with a depth of 33 fathoms ($60^{m}4$) over it, situated about 2 miles northward of Hertenbeest.

Chart 2732, plan of St. Nicolaas, Banjuwedang, and Pegametan bays.

Banjoewedang baai.—Pegametan baai.—The entrance to Banjoewedang (Banjuwedang) baai, about 2¾ miles south-eastward of the eastern end of Hertenbeest (*Lat. 8° 05′ S., Long. 114° 32′ E.*), is about three-quarters of a cable wide, with depths of from 7 to 11 fathoms ($12^{m}8$ to $20^{m}1$), between the coastal reefs on either side, which are plainly marked by discoloration. About half a mile inside, the bay trends eastward and becomes wider, but is much encumbered with reefs, and is only suitable for small craft with local knowledge. The shores are low and covered with mangroves; there are some hot sulphur springs at the head of the bay.

Pegametan baai, entered about 2 miles north-eastward of the entrance to Banjoewedang baai, affords anchorage in the northern part, in depths of from 10 to 16 fathoms ($18^{m}3$ to $29^{m}3$), with good holding ground. A shoal, with a rock which dries on it, lies in the middle of the bay, and the head of the bay is divided into two parts by a reef projecting northward from the southern shore; a 2-fathom ($3^{m}7$) patch lies in the entrance to the eastern part. The eastern side of the bay is formed by a reef, which dries, having a narrow coral

Charts 1653c, 941b, 2759a.

Chart 2732, plan of St. Nicolaas, Banjuwedang, and Pegametan bays.
ridge, covered with vegetation, on its northern side. The shores of the bay are low and covered with mangroves.

Chart 3726.

Tjeloekan Bawang.—Beacons.—A reef, which dries, and is steep-to, extends about 3½ cables north-eastward from the low western entrance point of this inlet, which lies about 7½ miles eastward of Tanjong Goendoel. Karang Rata, a low islet, partly overgrown with mangroves, lies on the northern edge of this reef, and another low islet of almost bare coral sand, with a triangulation pillar on it, lies about 1½ cables southward of Karang Rata. A shelving reef, clearly marked by discoloration, extends from the north-western side of Tanjong Tinga Tinga, the low eastern entrance point, and its western edge is marked by two black beacons each surmounted by a truncated cone. In the entrance to the inlet, between the reefs on either side, there are depths of from 14 to 33 fathoms ($25^{m}6$ to $60^{m}4$). The shores are low and are fringed by a coral reef which partly dries extending from a half to one cable offshore; a detached reef, with a least depth of 1½ fathoms ($2^{m}7$) over it, lies in the middle of the bay, and is marked by a white beacon, surmounted by a ball.

Tjeloekan Bawang village stands at the head of the inlet and a large, noticeable, round-topped tree is situated about 2½ cables south-westward of its mosque. There is a sheltered landing place westward of the village. Two beacons, situated about one cable westward of the mosque, in line, bearing 198°, lead into the inlet.

The inlet is sheltered in the west monsoon by the drying reef, and vessels should anchor in the entrance, in depths of from 27 to 33 fathoms ($49^{m}4$ to $60^{m}4$); small vessels can proceed in and anchor in the basin south-eastward of the 1½-fathom ($2^{m}7$) reef.

Reede Temoekoes.—Reede Temoekoes (Temukus), about 9½ miles eastward of Tjeloekan Bawang, is bounded by the parallel of lat. 8° 09′·5 S. and the meridians of long. 114° 59′ E. and 115° 00′ E.; it is the best roadstead on the north coast of Bali. Kramat rif, a great part of which dries, lies about 2¼ cables offshore northward of Temoekoes (Temukus) village, and is steep-to. The roadstead affords very good anchorage in the South-east monsoon, and there is fairly good shelter in the west monsoon under the lee of Kramat rif, but there is barely sufficient sheltered space for two vessels. There is also anchorage, in a depth of 14 fathoms ($25^{m}6$), in the narrow passage between Kramat rif (*Lat. 8° 10′ S., Long. 114° 59′ E.*) and the coast; in order to swing clear of the shoals extending from both sides, vessels should moor west-south-west and east-north-east. Approaching from westward, vessels should be careful to avoid the shoals lying within about three-quarters of a mile offshore between Kramat rif and Pengastoelan (Pengastulan) village, about 3½ miles westward. Approaching from eastward, vessels should keep in a depth of not less than 10 fathoms ($18^{m}3$), as the reef off Endjoeng Sangeang, about 1¼ miles north-eastward of Temoekoes, is extending.

Temoekoes village, one of the principal trading places in Bali, is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 934, plan of Reede Boeleleng.

Reede Boeleleng.—Danger.—Beacon.—Lights.—Reede Boeleleng, about 7 miles north-eastward of Temoekoes, affords very bad

Charts 1653c, 941b, 2759a.

Chart 934, plan of Reede Boeleleng.

anchorage, probably the worst on the north coast of Bali, and the bottom rises steeply. Panaroekan rif, in the north-eastern part of the roadstead, about 1¼ miles north-eastward of Boeleleng village and about 3½ cables offshore, consists of stones and coral, with a least depth of 3 feet (0m9) over it; a black beacon surmounted by a cone stands on the north-western side of the reef.

A light is exhibited, at an elevation of 56 feet (17m1), from a white iron framework structure, 46 feet (14m0) in height, about 2½ cables north-eastward of the mouth of Boeleleng rivier.

A light is exhibited, at an elevation of 23 feet (7m0), from a white iron column, near the Custom house at Boeleleng.

The roadstead is bounded by the meridian of a position about 4¾ cables westward of the light-structure situated eastward of the mouth of the river, and by lines drawn from the beacon on Panaroekan rif, in a 225° direction to meet that meridian, and in a 174° direction to the coast.

The least unfavourable anchorage for vessels in the vicinity of Boeleleng village, in the south-western part of the roadstead, is in a depth of 19 fathoms (34m7), with the main light-structure bearing 106°, distant 2½ cables. There is, however, better anchorage farther north-eastward, inside Panaroekan rif, in a depth of 13 fathoms (23m8), with the main light-structure bearing 211°, and the beacon on Panaroekan rif, 312°; this anchorage can be approached from eastward with the light-structure bearing 211°, but it must be remembered that the beacon stands on the north-western side of the reef, and that a 1¾-fathom (3m2) patch lies about 2 cables north-eastward of the beacon.

Boeleleng is one of the principal trading centres of Bali. The thick coconut woods along the coast westward of the town give place here to warehouses and houses built in European style. On the eastern side of the main street there is an iron bridge over Boeleleng rivier, which has a fairly wide mouth, but only a depth of 2 feet (0m6) in it. Eastward of the river is a beach of black volcanic sand and some fishing huts; the easternmost house is the Harbourmaster's, with the light-structure near it. A small pier is situated about one cable south-westward of the mouth of the river, and a small pier for boats lies about half a cable farther south-westward.

Boeleleng is connected by good roads with Tanjong Goendoel, Singaradja (Singaraja), the residence of a Government official, about 1½ miles south-south-eastward, and with Sangsit (*Lat. 8° 05′ S., Long. 115° 08′ E.*), 3 miles north-eastward. There is telephonic communication with Singaradja, which is connected to the general telegraph system; the roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Provisions are scarce, and water is unobtainable. There is a harbour doctor.

Chart 3726.

Reede Sangsit.—Reede Sangsit is situated off the village of the same name, about one mile north-eastward of Tanjong Panaroekan, which lies about 2 miles north-eastward of Boeleleng village. Fairly good anchorage may be obtained, in depths of from 14 to 16 fathoms (25m6 to 29m3), with a house with a red roof on the beach bearing 201°, distant about 4½ cables. Sangsit village is situated about half a mile inland.

Charts 1653c, 941b, 2759a.

Chart 1653c.

North-eastern side of Bali.—Coast.—The north-east coast of Bali is well populated and there are several large villages. Numerous spurs from the mountains run down to the coast, with sandy beaches, usually containing salt pans, in between. The 10-fathom ($18^{m}3$) line lies very close to the coast, and there are no dangers, except for a 6-fathom ($11^{m}0$) patch about 1½ miles eastward of Tanjong Boengkoelan (Bungkulan), the northern extremity of Bali. Owing to the steepness of the bottom there are few anchorages, and practically no shelter at all in the east monsoon.

In addition to the high mountains described on page 180, Koeboe (Kubu), a bare hill, 784 feet ($239^{m}0$) high, about 22 miles south-eastward of Tanjong Boengkoelan, is very prominent owing to its light colour and three dark bushes on the summit. Seraja (Seraya) gebergte, at the eastern extremity of Bali, show four peaks when seen from north-eastward; the southern and highest peak, with an elevation of 3,888 feet ($1{,}185^{m}0$), is conical, especially from eastward, and the eastern peak is round, both being wooded.

Tidal streams.—The north-going tidal streams from Straat Bali and Straat Lombok meet near Tanjong Goelah (Gulah), about 10 miles east-south-eastward of Tanjong Boengkoelan. When a south-going tidal stream is running through these two straits there is a west-going stream abreast Tanjong Boengkoelan, and east-going off Tanjong Ngis, 8 miles east-south-eastward of Tanjong Goelah; there is then an eddy under the coast, particularly noticeable in Reede Tianjar and Labuan Ambat (*see* below).

Chart 3726.

Coast.—Between Tanjong Boengkoelan (Bunkulan) and Tanjong Batu, a low, rocky point, 5 miles east-south-eastward, there is an open roadstead, with a depth of 11 fathoms ($20^{m}1$), soft mud and sand, about 3 cables offshore. The 6-fathom ($11^{m}0$) patch mentioned above lies in this roadstead. Between Tanjong Boengkoelan and Tanjong Saneh, about 3¾ miles east-south-eastward, there is a sandy beach with flat land behind. Spurs from the mountains approach the coast at Tanjong Batu. Midway between Tanjong Goelah and Tanjong Ngis there are continuous coconut plantations.

Chart 1653c.

Reede Tianjar.—Tianjar village stands 3¼ miles south-eastward of Tanjong Ngis, and at the foot of Batoer (Batur), a volcano, 8½ miles south-south-eastward of Tanjong Goelah. Noticeable objects when approaching the roadstead are:—a small temple at the north-western end of the village, a large round-topped tree between Tanjong Tekoerenan (Tekurenan), situated 2 miles south-eastward of Tanjong Ngis (*Lat. 8° 10′ S., Long. 115° 28′ E.*), and a round-topped tree and a fairly large house with a red roof south-eastward of the village. There are also two dark lava beds, devoid of vegetation, on the coast about half a mile south-eastward of the house with a red roof.

There is anchorage, in a depth of about 20 fathoms ($36^{m}6$), just westward of the transit: Koeboe in line with the round-topped tree at the south-eastern end of the village, bearing 193°.

Coast.—Between Tianjar and Labuan Ambat, 12 miles south-eastward, there is a flat strip of coast, behind which the land rises to Agoeng (page 179). Tanjong Soekadane (Sukadane), about 5½ miles south-eastward of Tanjong Tekoerenan, is low and has some detached

Chart 1653c.

rocks off it; a small temple and some huts near the point are visible from seaward, and southward of the point is a noticeable round-topped tree on a sandy hillock in the middle of a wood. A dark lava bed runs down to the sea on either side of the point.

Tanjong Moentik (Muntik) and Tanjong Batoe (Batu) Niti, 4 and 5¾ miles south-eastward of Tanjong Soekadane, respectively, are steep points formed by spurs from Agoeng. Tanjong Troena, about one mile south-south-eastward of Tanjong Batoe Niti, is the middle point of a high ridge along the coast. The bottom is too steep for anchorage off the coast between Tanjong Soekadane and Tanjong Troena.

Labuan Ambat, a slight bend in the coast between Tanjong Troena and Tanjong Djambelo, a low point about 2¼ miles east-south-eastward, affords anchorage for small vessels, in depths of from 20 to 30 fathoms (36^{m}6 to 54^{m}9), off Ambat village, which may be identified by a white house with a red roof. The roadstead is entirely open in both monsoons, and the sea breeze quickly raises a heavy surf on the coast; heavy squalls may occur at any time. There is an extensive wooded plain between the coast and the slopes of Agoeng. The coast between Labuan Ambat and Tanjong Poeri (Puri), 2½ miles south-eastward, is very steep.

South-eastern side of Bali.—Gili Selang or Manoek is a rock about 36 feet (11^{m}0) high, covered with vegetation, lying close off the eastern extremity of Bali. The coast here is formed by steep spurs from Seraja gebergte.

Charts 934, plan of Labuan Amuk and Ujung road, 1653c.

The south-east coast of Bali, between Gili Selang and Tanjong Lokan, about 5 miles south-westward, rises steeply to the summits of Seraja gebergte; thence the coast is low and flat as far as the northern entrance to Straat Badoeng (page 192), except for Boeboeg, an isolated, conical hill with a fairly sharp summit, 942 feet (287^{m}1) high, lying near the coast between Tanjong Bias Poetih (Putih) and Tanjong Boegboeg (Bugbug), situated about 3½ and 5¼ miles, respectively, south-westward of Tanjong Lokan. About 2½ miles north-westward of Tanjong Boegboeg is another isolated peak named Bukit Maloewang, 1,226 feet (373^{m}7) high. Except for these two hills there is a broad undulating stretch of land, covered with rice fields and coconut plantations, up to the foot of the slopes of Agoeng.

About one mile southward of Gili Selang the narrow coastal reef which dries commences and extends to Labuan Amoek (Amuk) (page 186); large rocks lie on this reef, especially off the high points. Westward of Labuan Amoek, is a ridge running in a north and south direction, but the two highest peaks, with elevations of 1,371 and 2,283 feet (417^{m}8 and 695^{m}9), respectively, are not very noticeable. Nearer the coast, between Tanjong Sari (*Lat. 8° 32′ S., Long. 115° 31′ E.*), 4¼ miles west-south-westward of Tanjong Boegboeg, and Tanjong Setra, a low sandy point, 4¾ miles farther south-westward, is a light green ridge of hills with three prominent summits, having elevations, from north to south, of 1,046, 880, and 840 feet (318^{m}8, 268^{m}2 and 256^{m}0), respectively; on the highest of these is a fan-shaped tree, and on the lowest a large round-topped tree. Djamboel (Jambul), 1,430 feet (435^{m}8) high, 6 miles north-westward of Tanjong Setra, may be identified by a temple and a large tree on its summit. About 2 miles north-north-eastward of Djamboel is a summit, 1,700 feet (518^{m}2) high, with a

Charts 941b, 2759a.

Charts 934, plan of Labuan Amuk and Ujung road, 1653c.

crown-topped tree on it. South-westward of Tanjong Setra the low, undulating plain forming the southern part of Bali continues as far as Tafelhoek (page 171).

Chart 934, plan of Labuan Amuk and Ujung road.

Oedjoeng (Ujung) village, situated on the coast about 4 cables northward of Tanjong Data, a sandy point about one mile south-westward of Tanjong Lokan, is the shipping place for Karang Asem, the capital of the district, a few miles inland. There is anchorage off the village, in depths of from 16 to 25 fathoms ($29^{m}3$ to $45^{m}7$), sand; vessels should not approach within a depth of 16 fathoms ($29^{m}3$), as the bottom rises very steeply.

Bias Poetih (Putih) village, 2½ miles south-south-westward of Oedjoeng, stands at the head of a small bight between Tanjong Perasi and Tanjong Bias Poetih, and may be identified by some warehouses, one with a zinc roof, and two with red roofs. There is anchorage in the middle of the bight, in a depth of 11 fathoms ($20^{m}1$), sand and stones, somewhat sheltered by Gili Biaha or Kelor, a rocky islet, 56 feet ($17^{m}1$) high, covered with vegetation, lying about 2½ cables south-eastward of Tanjong Bias Poetih. Near the top of Gili Biaha is an opening connecting with the sea by a tunnel; waves and surf beating up against this islet are emitted through this opening in fine spray, which from a distance resembles a column of smoke rising from a crater. The passage between Gili Biaha and Tanjong Bias Poetih, a steep-to, rocky point, is clear of dangers and deep, but the tidal streams run strongly through it.

Tanjong Boegboeg is a steep, but low point, formed by a spur from Boegboeg berg. Gili Tepekong, about 8½ cables southward of Tanjong Boegboeg, rises steeply from the sea, is 164 feet ($50^{m}0$) high, and covered with high grass; a reef which dries, with two large rocks on it, extends a short distance from its northern side. Half a mile north-westward of Gili Tepekong is a reef, which dries, with some rocks above water on it. The passages between this reef and Gili Tepekong, and between the reef and Tanjong Boegboeg, are clear of dangers and safe at slack water; the tidal streams, are, however, sometimes so strong that it is difficult to keep a vessel on her course.

Labuan Amoek.—Labuan Amoek (Amuk), known as Baai van Padang by the Koninklijke Paketvaart Maatschappij, is the name given to the western part of the bay entered between Tanjong Boegboeg and Tanjong Sari; the portion of this bay immediately westward of Tanjong Boegboeg is named Labuan Mendira, and the part westward of Mendira village is named Labuan Boeïtan (Buïtan).

The northern and north-western shores of this bay are rocky in places, with sandy beaches in between; the western shore is steep and hilly. Close northward of Tanjong Sari a narrow tongue of land extends a short distance eastward, and there is fairly sheltered anchorage about three-quarters of a mile northward of it, in a depth of 20 fathoms ($36^{m}6$). The bay is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij; good roads lead to the interior.

Telok Padang.—Light.—Telok Padang, the small bay on the south-western side of Tanjong Sari (*Lat. 8° 32′ S., Long. 115° 31′ E.*), is bounded by the parallel of Tanjong Boengsil, about 5 cables south-south-westward of Tanjong Sari, and the meridian of the summit of Bukit Maloewang. The bay is nearly filled up by a wide coastal reef,

Charts 941b, 2759a.

Chart 934, plan of Labuan Amuk and Ujung road.

which partly dries, leaving only a narrow channel used as a prau harbour. Padang village is situated at the head of the cove, and there is a landing pier with a flagstaff on its head; boats can berth alongside. There is a low, round-topped tree on Tanjong Boengsil, which is very noticeable from south-westward.

A light is exhibited from the flagstaff on the pier-head at Telok Padang.

Anchorage may be obtained in Telok Padang, in a depth of about 27 fathoms ($49^{m}4$), with the flagstaff bearing 300° and Tanjong Sari, 011°; this berth is about one cable from the 3-fathom ($5^{m}5$) line.

Chart 1653c.

Coast.—Between Tanjong Boengsil and Tanjong Serangan, about 18 miles south-westward, the coast is bordered almost throughout by a dark grey sandy beach. About 1½ miles south-westward of Tanjong Boengsil are two high trees, abreast the south-western of which is a dark rock, above water, lying close offshore, and half a mile south-westward is a temple, which is only noticeable from close offshore. Koesambe village stands close north-eastward of Tanjong Setra, and a long row of salt-pans, under sheds, extends from the village to the point.

Tanjong Kloto, about 3 miles westward of Tanjong Setra, may be identified by a temple with a round-topped tree near it. About three-quarters of a mile farther westward is another temple, which stands on a slight eminence about a quarter of a mile inland; as the eastern gate is frequently draped with white cloth, it is very noticeable, but its position not having been accurately determined it is not shown on the chart.

Lebih village, about 3 miles westward of Tanjong Kloto, is to a great extent hidden in a coconut plantation, but a large warehouse with a red roof, a house with a zinc roof farther inland, and a large round-topped tree projecting above the coconut trees, are noticeable. Anchorage may be obtained off Lebih, but landing is usually difficult. Sungei Petanoe (Petanu) flows out about 2½ miles south-westward of Lebih, running parallel with the coast for about 3 cables and forming a narrow tongue of land named Tanjong Petanoe (Petanu); this point may be identified by a small dark wood westward of it.

Chart 934, plan of Pantai Timur and Sanur road.

Pabean Ketewel village, about 1½ miles south-westward of Tanjong Petanoe, may be identified by three warehouses with zinc roofs, and three high round-topped trees with white trunks. Sungei Oös flows out near the village, and has scoured out an opening in the coastal reef which provides a good landing place. Tanjong Geling, about three-quarters of a mile south-westward of Pabean Ketewel, is a low, sandy point covered with trees; about 6 cables northward of the point is a noticeable house with a pointed roof; this house can be plainly seen when off Tanjong Serangan.

Reede Sanoer.—Reede Sanoer (Sanur), off Pabean Sanoer (Sanur) village, lies at the head of the large bight formed between Tanjong Geling and Tanjong Serangan (*Lat. 8° 43′ S., Long. 115° 16′ E.*). The northern part of the shore of this bight is fringed by a dark grey sandy beach, as along the coast farther northward, but in the southern part this colour changes to a whitish hue. The coastal reef is narrow

Charts 3726, 941b, 2759a.

Chart 934, plan of Pantai Timur and Sanur road.

in the northern part, but gradually widens out at Pabean Sanoer, where there is a channel, running in a southerly direction and navigable for boats at high water, between the reef and the coast. The depths decrease gradually towards the head of the bight, but they are irregular within depths of 7 fathoms (12^{m}8) and there are some detached reefs.

The large village of Sanoer stands a short distance inland, westward of Pabean Sanoer; the former may be identified by a large temple with a round-topped tree close to it, and the latter by a large white house with a tall tree near it. Northward of these villages is a cultivated plain, and southward of them a coconut plantation extends as far as Tanjong Serangan, a broad, low, sandy point covered with trees; about 2 miles westward of the point is a large, prominent round-topped tree. A few small rivers flow out in the northern part of the bight, the principal being the Biaoeng (Biaung) and the Sasang; the mouth of the former has high clay banks.

Directions.—Vessels should not anchor in a depth of less than 7 fathoms (12^{m}8), nor with Tanjong Serangan bearing less than 187°. During the west monsoon there is little tidal stream in the roadstead, but in the east monsoon the south-going stream from Straat Badoeng curves round here and runs at a considerable rate.

The best landing place is in the previously-mentioned channel in the coastal reef off Pabean Sanoer, and is reached by passing clear of some detached rocks which are not marked by discoloration or breakers, but are marked by small unofficial buoys, the north-eastern of which is red, and then steering southward at high water into the channel; a very strong tidal stream may run in this channel. At low water landing should be effected on the beach northward of the coastal reef.

Pantai Timoer.—Pantai Timoer (Timur), the bay on the eastern side of the isthmus connecting Tafelhoek with the main part of Bali, is almost entirely filled by a reef, which dries, leaving two channels, the southern of which is known as Benoa channel (page 189); the northern channel, leading to the northern extremity of Pulau Serangan, is only navigable for boats, and is marked with unofficial stakes.

The southern entrance point of Pantai Timoer, is situated about 3½ miles south-south-westward of Tanjong Serangan, and is the northern extremity of a narrow tongue of land extending northward from the north-eastern side of Tafelhoek; Benoa village, known locally as Tandjoeng Benoa, stands on this point, and is chiefly inhabited by Chinese and Buginese. Benoa Oedjoeng, now the main shipping place of the district, is built on the reef, which dries, on the northern side of Benoa channel, about 6 cables north-westward of Benoa village. The shores of the bay consist mostly of mangrove swamps; at Benoa village there is a white sandy beach, which extends along the seaward side of the tongue of land as far as Nusa Doea (Dua), two tolerably high, thickly wooded islets lying on the drying coastal reef 3 miles south-south-eastward of Benoa village (*Lat. 8° 45′ S., Long. 115° 13′ E.*). There is a rock above water between these two islets. Toeban (Tuban) village, on the mud bank forming the western shore of Pantai Timoer, cannot even be reached by sampans at low water.

Pulau Serangan, lying across the entrance to Pantai Timoer, and with its northern extremity 1¾ miles south-westward of Tanjong

Charts 3726, 1653c, 941b, 2759a.

Chart 934, plan of Pantai Timur and Sanur road.

Serangan, is mostly covered with coconut trees, and has a white sandy beach on its eastern side. There is a tall tree on the northern extremity of the island, and a large village is situated on the western side of this point, but only the red, pointed roof of a temple is visible from seaward. The western side of this island is covered with mangroves, and there is a fine temple on a projecting point in the south-western part.

Outer roadstead.—Reede Benoa is bounded on the seaward side by the arc of a circle, described with the radius of 2 miles, from the flagstaff of the harbour office at Benoa Oedjoeng.

Anchorage can be obtained almost everywhere outside the 10-fathom (18m3) line in the open bight between Tanjong Serangan and Nusa Doea, although there is often a heavy swell on the shoal ridges about 1¼ miles north-eastward of Nusa Doea; the least depth on these ridges is 6½ fathoms (11m9). During the west monsoon a high swell, almost breaking, runs over them; when such is the case, it is advisable to proceed to Reede Sanoer, or to anchor from 1½ to 2 miles northward of Nusa Doea, off the eastern side of the tongue of land on the southern side of Benoa channel. There is also anchorage off the entrance to the channel leading to the northern extremity of Pulau Serangan, with the prominent round-topped tree about 1¾ miles westward of Tanjong Serangan in line with the sharply defined break between the white sandy beach of that point and the mangrove shore of Pantai Timoer, bearing 315°. A strong tidal stream runs in and out of the channels through Pantai Timoer.

Chart 934, plan of Benoa channel.

Benoa channel.—Benoa channel, between the southern end of Pulau Serangan and Benoa village, penetrates a considerable distance through the drying reef of Pantai Timoer and forms a natural harbour; owing to its position in the most fertile part of Bali, and also to the indifferent anchorages elsewhere around the island, Benoa village has become the most important shipping place in Bali.

Off the entrance of Benoa channel the 10-fathom (18m3) line runs about one mile outside the coastal reef, and within this are irregular depths of from 3¼ to 8 fathoms (5m9 to 14m6), sand and coral. The least depth in the fairway over the outer bar, in 1949, was 17 feet (5m2); the bottom consists mainly of sand mixed with coral and stones; the edges of the channel are steep-to.

Benoa only affords berths for the numerous native and Chinese trading craft. Benoa Oedjoeng on the northern side of the channel, where it broadens out somewhat, comprises various sheds and offices erected on a square emplacement, each side being about half a cable long, on the edge of the drying reef. A dam, carrying a good road, is built across the drying reef and extends northward to Denpasar, the capital of the district. On the southern side of Benoa Oedjoeng (*Lat. 8° 45′ S., Long. 115° 13′ E.*) are two wharves with depths of 23 feet (7m0) alongside.

Benoa Oedjoeng is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and is connected by telephone with Denpasar. Provisions can be obtained in small quantities from Denpasar. The Harbour office is at Benoa Oedjoeng. There is a harbour doctor, and there is a hospital at Denpasar with accommodation for a few Europeans.

Charts 3726, 1653c, 941b, 2759a.

Chart 934, plan of Benoa channel.

Dangers.—Beacons.—The northern side of Benoa channel is marked by five white beacons, each surmounted by a ball; the outer of these stands about 6½ cables east-south-eastward of Tandjoeng Benoa; the southern side is marked by 7 black beacons each surmounted by a truncated cone; the outer of these stands about one mile east-south-eastward of Tandjoeng Benoa.

Leading beacons for entering the channel are situated south-eastward of Tandjoeng Benoa; the front beacon, which is surmounted by a white triangle, point down, stands on the edge of the reef on the southern side of the channel about 6 cables south-eastward of Tandjoeng Benoa; the rear beacon, surmounted by a white triangle, point up, stands on the tongue of land about 3½ cables westward of the front beacon.

A rectangular board, painted black and white in horizontal bands, stands on a hut on the dam, about 2 cables north-westward of Benoa Oedjoeng.

A shoal, with a depth of 2¾ fathoms (5^{m}0) over it, marked by a black can buoy, lies on the southern side of the channel about 2½ cables eastward of Tandjoeng Benoa. A 1¼-fathom (2^{m}3) patch lies about half a cable southward of this shoal. A 2½-fathom (4^{m}6) patch, marked by a truncated cone beacon, lies about three-quarters of a cable eastward of the 2¾-fathom (5^{m}0) shoal.

A rock, which dries, lies close off the northern shore about half a cable west-north-westward of the fourth ball beacon. A reef, which dries, marked on its northern side by a truncated cone beacon, lies about 1½ cables south-eastward of the wharves at Benoa Oedjoeng. A 1¼-fathom (2^{m}3) patch, marked on its northern side by a black can buoy, lies about half a cable north-eastward of this cone beacon. A 1½-fathom (2^{m}7) patch, marked by a black conical buoy, lies about three-quarters of a cable southward of the wharves at Benoa Oedjoeng (*Lat. 8° 45′ S., Long. 115° 13′ E.*).

The reefs in the channel have extended and, in 1947, the beacons did not mark their extremities; caution is, therefore, necessary in navigating the channel.

Tidal streams and tidal signals.—A strong tidal stream sets in and out of Benoa channel. During the period of the moon's minimum declination (0° to 6°) the tidal stream appears to be semi-diurnal, turning about half an hour after the times of semi-diurnal high and low water.

The following tidal signals, shown in white, are displayed from the flagstaff on the pier at Benoa Oedjoeng:—

A cylinder, with a cone, point up, above it, and a cone, point down, below it.	Slack water.
A cylinder, with a cone, point up, above it.	In-going stream.
A cylinder, with two cones above it, each point up.	Strong in-going stream.
A cylinder, with a cone, point down, below it.	Out-going stream.
A cylinder, with two cones below it, each point down.	Strong out-going stream.

The in-going tidal stream eastward of the eastern wharf at Benoa Oedjoeng sets strongly southward, and the out-going stream strongly northward.

Directions.—Owing to the sharp turn in Benoa channel southward of the outer white ball beacon, it is inadvisable to proceed in or out

Charts 3726, 1653c, 941b, 2759a.

Chart 934, plan of Benoa channel.

when the tidal stream is running at a rate of more than one knot. Vessels from 200 to 230 feet ($61^{m}0$ to $70^{m}1$) in length always find some difficulty in negotiating this turn, even with a slight stream, and, when entering on the out-going stream, care should be taken not to be set on the coastal reef on the southern side of the channel; vessels exceeding the above length should wait for slack water. The most favourable times for entering are one hour before high water or one hour after low water.

A vessel proceeding through Benoa channel with the leading marks in line, bearing 261°, should not get southward of this alignment when near the second cone beacon from seaward, as the depths decrease rapidly in this vicinity. After rounding the first ball beacon she should steer to pass the fourth cone beacon at a safe distance and then steer for Tandjoeng Benoa, bearing 276°, thus passing southward of the fifth cone beacon, which stands in the middle of the channel. When she is abeam of this beacon she should steer 315°, passing well clear north-eastward of the black buoy. From a position between this buoy and the third ball beacon she should steer 270° and thence keep in mid-channel, giving the fourth ball beacon a good berth, and thence steer to pass northward of the black can buoy marking the northern side of the 1¼-fathom ($2^{m}3$) patch situated about 2 cables east-north-eastward of the wharves at Benoa Oedjoeng (*Lat. 8° 45′ S., Long. 115° 13′ E.*).

The south-western side of Bali is described on pages 171-173.

Chart 1653c.

STRAAT LOMBOK.—Straat Lombok, between Bali and Lombok, is the most important passage for vessels proceeding between Macassar strait and the Indian ocean, mainly on account of its width and the ease by which it can be navigated. The southern entrance is divided into two parts by Nusa besar (page 194) and Lembongan, which lie on a detached plateau with depths of less than 100 fathoms ($182^{m}9$); the portion of the strait north-westward of these islands is known as Straat Badoeng (page 192).

Winds.—During the South-east monsoon calms are frequent from sunrise to noon, when a fresh southerly wind arises, turning to south-east on the Bali side, and to south-south-west on the Lombok side, blowing strong during the night. In the North-west monsoon the winds are generally from north-west, sometimes with violent squalls, and a high sea in the northern approach.

Tidal streams.—The tidal streams in Straat Lombok have a semi-diurnal character, but are influenced by the currents northward of the strait and in the Flores sea, produced by the monsoons, so that in the strength of the east monsoon a predominating south-going stream may be expected, and in the west monsoon a predominating north-going stream. There is insufficient information available to give full particulars of the rate and direction of the tidal streams.

In the narrows of Straat Lombok between Nusa besar and Lombok, the stream is stronger, at times attaining a rate of 6 knots, than in the wider, northern part where it has a maximum rate of 3½ knots, and the direction is more directly north and south than elsewhere. At the southern entrance to Straat Lombok, the R.F.A. *War Krishna*, in 1928, experienced very heavy tide-rips and whirling eddies, which caused the vessel to swing from three to four points off her course; these

Charts 3726, 941b, 2759a.

Chart 1653c.

tide-rips and eddies appeared to extend across the strait and could not be avoided. There is often a turbulent sea southward of the narrows, and on this side of the strait especially the tidal streams are felt far outside.

H.M.S. *Falmouth* experienced, in 1939, with a calm wind and sea, a heavy breaking swell extending right across the southern entrance to Straat Lombok sufficient to expose a vessel of 1,000 tons to the risk of being broached-to.

Exceptionally strong streams have been observed in the vicinity of Gili Selang, under the Bali shore on the western side of the northern entrance. In 1932, R.M.S. *Franconia* experienced heavy tide-rips, eddies, and overfalls extending right across the northern part of the strait in a south-easterly direction from near Gili Selang (*Lat. 8° 24′ S., Long 115° 43′ E.*); at a speed of 15 knots the vessel was swung more than a point off her course.

Considerable variations in the direction of the tidal streams may be expected north-eastward of Straat Badoeng, off Labuan Amoek and there are often eddies in Reede Ampenan, on the eastern side.

Straat Badoeng.—Light.—Straat Badoeng (Badung) is much used for local navigation in these waters, especially as Benoa, the principal shipping port of Bali, is situated on the western shore of this strait.

A light is exhibited, at an elevation of 49 feet ($14^{m}9$), from a white iron framework structure, 49 feet ($14^{m}9$), in height, on Tanjong Taäl, the north-western extremity of Lembongan.

Tidal streams.—The tidal streams in Straat Badoeng are semi-diurnal, but, owing to the fact that its direction runs obliquely to the general north and south trend of Straat Lombok, and the curved shape of the deep channel, the character of the streams is very complicated. The tidal streams are also influenced by the monsoons, in the same manner as in Straat Lombok.

The strongest stream, with a maximum rate of 8 knots, occurs in the east monsoon, the direction being between south-west and south; the strongest stream in the opposite direction occurs in the west monsoon, the maximum rate being from 4 to 5 knots. In April, 1927, the German cruiser *Emden* experienced strong tide-rips and eddies, rendering steering difficult, even at a speed of 13 knots.

West monsoon.—About the time of the moon's transit the tidal stream sets between north and north-east, over a strip about 2½ miles wide along the Bali shore, between Tanjong Serangan and Tanjong Boegboeg; in the remainder of the strait there is then a predominating stream setting between south and south-west with strong whirling eddies along the line between the two contrary streams.

About 2 hours after the moon's transit the strip setting between north and north-east becomes narrower between Tanjong Serangan and Tanjong Sari, but eastward of the meridian of the latter point it increases in width to such an extent that, between Tanjong Boegboeg, and Tanjong Kramitan, the north-eastern extremity of Nusa besar, the stream sets north-eastward towards Straat Lombok almost throughout. At the same time there is a tolerably wide strip off Lembongan with a north to north-east-going stream; towards the middle of the strait, however, the south-going stream, which has a rate of from half a knot to 3 knots, causes strong whirling eddies.

Charts 941b, 2759a.

Chart 1653c.

About 4 hours after the moon's transit the general direction of the stream in the strait is between south-west and south, with a maximum rate of 4½ knots, but north-eastward of Tanjong Setra there is then a more or less wide eddy under the Bali shore setting north-eastward.

About 6 hours after the moon's transit the south-west to south-going stream decreases to a rate of about 2 knots, and the north-easterly eddy under the Bali shore is observed to start farther southward in the strait, near Tanjong Petanoe (*Lat. 8° 37′ S., Long. 115° 19′ E.*).

About 8 hours after the moon's transit the south-west to south-going stream practically disappears, and from the outer roadstead of Benoa to Tanjong Boegboeg there is a north to north-east-going stream, with a rate of from one to 2 knots, over a strip from 3 to 4 miles wide along the Bali shore.

About 10 hours after the moon's transit there is a north to north-east-going stream throughout the entire strait, although within a distance of 3 miles from the Bali shore there are whirlpools and patches of much weaker stream, and sometimes it even sets southward.

East monsoon.—About the time of the moon's transit there is a north to north-east-going stream along the Bali shore between Tanjong Petanoe and Tanjong Boegboeg, over a strip about 3 miles wide; in the remainder of the strait there is then a strong south-west to south-going stream, with a maximum rate of 5½ knots, with whirling eddies along the line between the two opposing streams.

About 2 hours after the moon's transit the north to north-east-going stream practically disappears, and throughout the strait there is a south-west to south-going stream, attaining for a short period a maximum rate of 8 knots, although the average rate is not more than 3½ knots.

About 3 to 4 hours after the moon's transit there is still a general south-west to south-going stream, which generally attains its maximum mean rate of 4½ knots at this time; a maximum rate of 8 knots has been also observed during this period, whilst sometimes an eddy runs under the Lembongan shore, with whirling eddies where the main stream and eddy meet. The south-west to south-going stream is always weaker under the Bali shore.

About 6 hours after the moon's transit the average rate of the south to south-west-going stream is still 3 knots, but the stream under the Bali shore now becomes very weak.

About 8 hours after the moon's transit the south-west-going stream decreases to a mean rate of 2 knots; under the Bali shore, in the bight between Tanjong Setra and Tanjong Serangan, slack water may now be expected, whilst a north-east-going stream may be running along Labuan Amoek.

About 10 hours after the moon's transit, the north to north-east-going stream commences under the Bali shore as far southward as Tanjong Petanoe, the average rate being 1½ knots, and the maximum rate 3 knots. On the opposite side of the strait, along Lembongan, there is a south-west to south-going stream; in the remainder of the strait the stream is more or less confused, but the inclination towards a south-west to south-going stream, which occurs in this area at the time of the moon's transit, becomes more and more noticeable.

Charts 941b, 2759a.

Chart 1653c.

Nusa besar and Lembongan.—Nusa besar, in the middle of the southern entrance to Straat Lombok, is mountainous. Moendi (Mundi), the highest peak, is steep on its western side and has a round-topped tree on its summit; nearly 2 miles east-north-eastward of Moendi is a more rounded peak, 1,582 feet (482^{m}2) high. These mountains slope down gradually to the north coast, but elsewhere they rise fairly steeply from the sea. In the South-east monsoon Nusa besar and the adjacent islands have a barren appearance, except in a few places where there are coconut plantations. Owing to the great depths close around the island, there are no anchorages.

Chart 934, plan of West coast of Nusa besar.

Lembongan and Tjeningan lie close together on a reef, which dries, close off the north-west coast of Nusa besar, and are almost entirely planted with coconut trees. The south-western part of Lembongan is hilly, the north-eastern part is low; a reef extends nearly half a mile from Tanjong Taäl (*Lat. 8° 40′ S., Long. 115° 27′ E.*). For light on Tanjong Taäl, *see* page 192. Tjeningan is hilly, except on its north-western side; it has no fixed population, but the inhabitants of Lembongan live there temporarily.

The passage between Tjeningan and Nusa besar is about half a mile wide and very deep, with steep-to shores on either side; it is, however, difficult to navigate owing to the strong tidal streams running through.

On the west coast of Nusa besar there is a sandy beach in a small bay about 1¼ miles northward of Tanjong Pandan, the south-western extremity of the island, and also in a small bay opposite the southern end of Tjeningan; in the middle of the entrance to the latter is a rocky islet, and on the beach is a coconut plantation with some dwellings. About 3 cables southward of Tanjong Pandan, and about one cable offshore, is a noticeable rock covered with vegetation, rising out of deep water.

Chart 1653c.

About 2½ miles south-eastward of Tanjong Pandan a steep-to, low, arched rock rises from deep water about 2¾ cables offshore. Batu Loemboeng (Lumbung), 174 feet (53^{m}0) high, lies nearly half a mile offshore about 5½ miles south-eastward of Tanjong Pandan, and is shaped like a shoe with the toe to seaward; in the channel between this rock and the coast are depths of 24 fathoms (43^{m}9).

On the south and south-east coasts of Nusa besar the only landing place is in Telok Sedihing, a small inlet immediately eastward of the southern extremity of the island, where there is a narrow sandy beach with a small temple on it. The inlet is, however, too much encumbered with rocks for anchoring, and there are great depths outside; the mountains rise steeply immediately behind the beach.

Batu Aba, close off the eastern extremity of Nusa besar, is a rock, 125 feet (38^{m}1) high, covered with vegetation; a ridge, with depths of less than 10 fathoms (18^{m}3) over it, and two large bare rocks on it, lie about 2 cables southward from Batu Aba. In case of necessity vessels can anchor in the small bay westward of Batu Aba, in a depth of from 15 to 20 fathoms (27^{m}4 to 36^{m}6), sand with stone and coral, but the tidal streams there are strong and irregular.

There are several villages along the north and north-east coasts of Nusa besar, the principal being Batoe Noenggoel, close-south-eastward of Tanjong Kramitan. There are no detached dangers off these coasts.

Charts 941b, 2759a.

Chart 934, plan of west coast of Nusa besar.

Anchorage off Lembongan.—About half a mile north-eastward of Tanjong Sangiang, the south-western extremity of Lembongan, is a small bay with a sandy beach, on which is a temple with a round-topped tree near it; from here a road leads to Lembongan village, standing on the southern slopes of the hills and not visible from the bay. There is good anchorage off this bay, in depths of from 6 to 7 fathoms (11^m0 to 12^m8), coral and stone; making this anchorage is, however, difficult owing to the strong tidal stream running round Tanjong Sangiang and the reef extending from Tanjong Taäl (*Lat. 8° 40′ S., Long. 115° 27′ E.*), whilst at the same time there may be slack water in the bay itself. The round-topped tree near the temple in line with the western side of a noticeable rock on the coastal reef near the head of the bay, bearing about 198°, leads just clear westward of the reef extending from Tanjong Taäl.

Chart 1653c.

WESTERN SIDE OF LOMBOK.—The northern part of the western side of Lombok, between Tanjong Papak, situated about 29 miles east-north-eastward of Gili Selang, and Tanjong Ketjinan (Kechinan), 10 miles south-westward, is low, but rises rapidly to high land a short distance within. The depths within the 100-fathom (182^m9) line, which lies as much as 5 miles from the coast, are very irregular.

Off-lying islands and reefs.—Trewangan is the highest and westernmost of a chain of three islands extending about 4½ miles westward from Tanjong Sirrah, the extremity of a tongue of land 6½ miles south-westward of Tanjong Papak; the other two islands, Méno and Aér, are flat but are covered with tall trees.

A reef, with a depth of 3¾ fathoms (6^m9) over it, lies about one mile north-eastward of Méno, and from here a succession of detached reefs, with deep water between, extends eastward to the coast. A patch, with a depth of 2 feet (0^m6) over it, lies about 2¼ miles north-north-eastward of Tanjong Sirrah, and is plainly marked by discoloration, although the other dangers are not visible; another series of detached reefs extends for about 1¼ miles east-south-eastward from this patch. Vessels without local knowledge should pass well outside these islands and dangers.

A 1¼-fathom (2^m3) patch lies about half a mile westward of Ketapang, a noticeable village on the coast about 1½ miles south-south-westward of Tanjong Papak.

Anchorage.—Good anchorage may be obtained by vessels with local knowledge off Ketapang, close offshore, in a depth of 10 fathoms (18^m3). The best approach is with the village bearing 158°.

Reede Sorong.—Beacons.—Reede Sorong lies between two reefs, which dry, extending north-westward from the villages of Sorong Djoekoeng and Paloh, situated about 3¼ and 4½ miles, respectively, south-westward of Tanjong Papak; these reefs are prolonged northward by a ridge, with depths of less than 3 fathoms (5^m5) over it, and partly act as breakwaters and provide a good anchorage.

The roadstead is a shipping place for local products, and is the headquarters of a Government official.

A white beacon, surmounted by a ball, stands on the north-eastern edge of a reef on the western side of the roadstead, about 8 cables

Charts 941b, 2759a.

Chart 1653c.

westward of Sorong Djoekoeng, and a black beacon, surmounted by a cone, marks the western edge of the drying reef which extends from the same village.

Directions.—Reede Sorong is easily entered by vessels with local knowledge, aided by the beacons and a reef, which dries and marked by discoloration, situated near the outer end of the ridge extending northward from Sorong Djoekoeng. A vessel can pass close eastward of the white ball beacon, as it stands on the outer edge of the reef.

A vessel approaching from southward can pass either eastward or westward of Aér, or between Méno and Trewangan, but the passage between Aér and Méno is usually taken by keeping Tanjong Mipah (*see* below) astern, bearing 202°. After passing through this passage the vessel should alter course eastward and keep the northern extremity of Trewangan astern, bearing 252°, which leads northward of all dangers. A vessel with local knowledge, after passing between Aér and Méno, can thence round Aér at a distance of about half a mile and steer eastward, passing southward of the outer dangers.

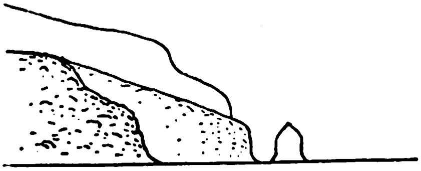
Chart 2732, plan of Kombal bay.

Kombal baai.—Dangers.—Kombal baai, entered between Tanjong Sirrah (*Lat. 8° 22′ S., Long. 116° 06′ E.*) and Tanjong Ketjinan, lies open to the west monsoon, and does not then always afford suitable anchorage; with stiff north-westerly winds in Straat Lombok, however, there is sometimes a light wind from between north-north-east and north-east in Kombal baai, and when such is the case there is good anchorage off Baroe (Baru) village, about 2 miles southward of Tanjong Sirrah, in a depth of 10 fathoms ($18^{m}3$).

A reef, with a depth of 7½ fathoms ($13^{m}7$) over it, lies about 2¼ miles north-westward of Tanjong Ketjinan. A steep-to reef, with a depth of 2 fathoms ($3^{m}7$) over it, lies nearly 1¾ miles south-westward of Tanjong Sirrah, and about 7 cables south-eastward of this reef is a reef with a least depth of 1½ fathoms ($2^{m}7$) over it. A reef, with a depth of 2 fathoms ($3^{m}7$) over it, lies about 6 cables northward of Baroe village. Owing to the existence of these reefs, and some reefs near Tanjong Sirrah, it is advisable to approach the anchorage off Baroe village from south-westward, along the southern shore of the bay. A small shoal, with a depth of 1¾ fathoms ($3^{m}2$) over it, lies about one cable offshore and 1¼ miles eastward of Tanjong Ketjinan.

Chart 1653c.

Coast.—From Tanjong Ketjinan to Tanjong Santigi, 6 miles southward, the coast is very steep and mountainous, and can be approached close-to. A prominent rock lies close off Tanjong Mipah, situated about 2 miles south-south-westward of Tanjong Ketjinan; there is also a rock about half a cable westward of Tanjong Mangsit, nearly 3 miles southward of Tanjong Mipah.



Tanjong Mipah, bearing 202°.
(*Original date* 1947.)

Chart 2732, plan of Ampenan road.

Reede Ampenan and approaches.—Lights.—Dangers.—Beacon.—Ampenan, 4¼ miles south-south-eastward of Tanjong

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Chart 2732, plan of Ampenan road.
Santigi, is the principal trading place in Lombok, and is situated near the mouth of Kali Djankok (Jangkok), which is the only river on the west coast of Lombok which does not dry at the mouth during the South-east monsoon. During this season the trade by native craft is particularly brisk.

The roadstead is bounded by the meridian of the beacon on Medusa rif (*see* below) and by the parallels of the southern point of the entrance to Kali Djankok and of the roadstead boundary mark, about one mile northward of the river entrance.

A light is exhibited, at an elevation of 40 feet (12^{m}2), from a white iron framework structure, 42 feet (12^{m}8) in height, near the flagstaff on the northern side of Ampenan.

A light is exhibited, at an elevation of 20 feet (6^{m}1), from a white iron column, 13 feet (4^{m}0) in height, on the pier-head.

Santigi rif, with a least depth of 1½ fathoms (2^{m}7) over it, lies about 1½ miles southward of Tanjong Santigi. A 3¼-fathom (5^{m}9) patch lies about 5½ cables offshore and 7½ cables south-south-eastward of the same point, and nearly 1½ miles farther in the same direction and 6½ cables offshore is a 3¾-fathom (6^{m}9) patch. Wilhelmina rif, with a depth of 5 feet (1^{m}5) over it, lies one mile north-north-westward of the light-structure and 3½ cables offshore. Medusa rif, with a least depth of 3 fathoms (5^{m}5) over it, lies about one mile west-south-westward of the light-structure (*Lat. 8° 34′ S., Long. 116° 04′ E.*), and three shoals, with depths of from 2¾ to 3 fathoms (5^{m}0 to 5^{m}5) over them, extend nearly 3 miles southward of Medusa rif. A white beacon, surmounted by a ball, marks the northern side of Medusa rif. Owing to the existence of these reefs it is advisable to approach the roadstead by passing northward of Medusa rif.

Anchorage.—Reede Ampenan affords safe anchorage during the South-east monsoon and transition periods, inside the ridge of banks, and shoals running parallel with and about one mile offshore. During the west monsoon communication with the shore is often suspended for days in succession, and a blue flag is then displayed at the flagstaff; praus then proceed to Laboean Tring baai to discharge their cargo. Vessels of deep draught usually anchor about half a mile offshore, in depths of from 9 to 10 fathoms; precautions should be taken to avoid dragging their anchors.

Harbour facilities.—An iron pier, 130 feet (39^{m}6) in length, with a depth of 12 feet (3^{m}7) at its head, is situated near the harbour office, about one cable south-south-westward of the light-structure; near its head is a small crane. There are several mooring buoys near the pier. There is a harbour doctor.

Fresh provisions are plentiful, but water is not obtainable.

Ampenan is connected with the general telegraph system, and there is telephonic communication with Labuan Hadji, on the east coast of Lombok. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 1653c.
Coast.—Between Ampenan and Tanjong Pandanan, about 16 miles south-westward, there are numerous dangers, and vessels passing through Straat Lombok usually keep outside the 100-fathom (182^{m}9) line here. In addition to the mountains in the northern part of Lombok, described on page 200, there are several noticeable mountains

Charts 941b, 2759a.

Chart 1653c.

and hills near Laboean Tring baai (*see* below), the principal of which are :—Perampoean 187 feet ($57^{m}0$) high, close inland, about 4 miles southward of Ampenan; Pengsong, 325 feet ($99^{m}1$) high, about 4 cables south-south-eastward of Perampoean; Koeripan (Kuripan), 1,309 feet ($398^{m}9$) high, 5½ miles south-eastward of Pengsong; and Maredjek (Marejek), 2,428 feet ($740^{m}0$) high, about 4½ miles southward of Koeripan.

Charts 2732, plan of Labuan Tring bay, 1653c.

Tanjong Grésak, on the western side of the entrance to Laboean Tring baai, may be identified by an isolated hill, 640 feet ($195^{m}1$) high, about 6½ cables southward of it. The coast between Tanjong Grésak and Tanjong Pandanan is indented by several bays with a number of outlying islets and reefs, and is practically uninhabited. The bay between Tanjong Grésak and Tanjong Lingong, 2¾ miles westward, is partly enclosed by the islets Soeda (Suda), Tangkong, and Nanggoe, but the eastern part is foul. The steep-to coastal reef extending from Tanjong Grésak and that from these islets are marked by discoloration. Tanjong Bebera, about three-quarters of a mile eastward of Tanjong Pandanan, is low, and there is a sandy beach westward of it.

Chart 1653c.

Islets and dangers.—Po, a low islet, 1½ miles north-westward of Tanjong Lingong, is an excellent landmark; Lontar, about one mile south-south-westward of Po, is a similar islet, but, lying closer to the coast, is not so noticeable. Farther westward, between Tanjong Tamberan, situated about 1½ miles westward of Tanjong Lingong, and Tanjong Pandanan (*Lat. 8° 43′ S., Long. 115° 51′ E.*), are the islets Gedeh, Ringgit, Lajar (Layar), and Asahan, fringed by reefs and difficult to approach.

The following are the most important of the numerous reefs lying in the large bight between Ampenan and Tanjong Pandanan :—From a position about 5 miles south-south-westward of Ampenan light-structure a narrow bank of coral extends close within the 100-fathom ($182^{m}9$) line for a distance of about 6¼ miles in a west-south-westerly direction; the least depth on this bank, near the eastern end, is 19 feet ($5^{m}8$). A detached patch, with a depth of 15 feet ($4^{m}6$) over it, lies about one mile southward of the eastern end of the bank, and a shoal, with a depth of 11 feet ($3^{m}4$) over it, lies about 2 miles eastward and about three-quarters of a mile offshore.

About 1¼ miles north-westward of Tanjong Grésak is a coral head with a depth of one foot ($0^{m}3$) over it, usually marked by breakers; between this reef and Tanjong Lingong are three patches, with depths of from 6 to 11 feet ($1^{m}8$ to $3^{m}4$) over them. About three-quarters of a mile westward of Po is a small reef, with a depth of 3 fathoms ($5^{m}5$) over it.

Chart 2732, plan of Labuan Tring bay.

Laboean Tring baai.—Beacons.—Laboean (Labuan) Tring baai, situated in the south-eastern corner of the large bight between Ampenan and Tanjong Pandanan, affords good anchorage at all times, but particularly during the South-east monsoon; with northerly winds it is advisable to anchor in the inner bay, eastward of Tanjong Tjemara (Chemara), about 1¾ miles south-eastward of Tanjong Grésak.

Tanjong Boenoetan (Bunutan), the western entrance point, is situated three-quarters of a mile east-south-eastward of Tanjong Grésak,

Charts 941b, 2759a.

Chart 2732, plan of Labuan Tring bay.

and is bluff and easily identified; the coast close southward of it is fringed by a reef extending about 1½ cables offshore, reducing the navigable width of the entrance to about 4 cables. The eastern side of the entrance is low and sandy; the remainder of the shore is alternately high and low, and is fringed by a mud bank, which extends farther offshore off the low parts and is covered with mangroves. A few streams flow into the bay, and there are a number of villages and limekilns along the shores.

The entrance to the inner bay, between the banks extending from Tanjong Tjemara and Tanjong Koeboer (Kubur), half a mile south-eastward, is narrow, but is easy to navigate on account of the beacons on either side; there is always calm water inside this bay, and, when communication with the shore is impracticable at Ampenan, praus discharge cargo at Lembar village, on the northern shore. There is a good road from Lembar to Ampenan. Laboean (Labuan) Tring, an unimportant hamlet, is situated on the southern shore, near the head of the bay. There is a wooden wharf, with a depth of 16 feet ($4^{m}9$) alongside.

Two black beacons, each surmounted by a cone, mark the northern side of the entrance to the inner bay, and two white beacons, each surmounted by a ball, mark the southern side. A white beacon, surmounted by a ball, marks the edge of the bank extending from Tanjong Njet (Nyet), on the southern side of the inner bay, about half a mile north-eastward of Tanjong Koeboer (*Lat. 8° 45′ S., Long. 116° 04′ E.*), and a black beacon, surmounted by a cone, marks the edge of the bank extending from the northern shore close westward of Lembar village.

Charts 2732, plan of Labuan Tring bay, 1653c.

Directions.—During the South-east monsoon and the transition periods, a vessel with local knowledge making for Laboean Tring baai from northward can proceed close along the coast, inside Medusa rif and the reefs lying southward of it, keeping in depths of not less than 7 fathoms ($12^{m}8$). This route, however, should not be taken in unfavourable circumstances during the west monsoon.

If passing outside the reefs, the vessel should, on leaving Reede Ampenan, steer a westerly course, passing outside Medusa rif and between the shoals westward of the coast abreast Pengsong by bearing; or she can continue westward from Reede Ampenan until Ringgit bears 180°, when she should steer for it on that bearing, and when Koeripan bears 090°, steer for it on that bearing, which leads about half a mile northward of the 3-fathom ($5^{m}5$) patch westward of Po, and northward of the one-foot ($0^{m}3$) patch north-westward of Tanjong Grésak. When Laboean Tring baai is well open she should enter it on a southerly course, giving Tanjong Boenoetan a wide berth on account of the reef extending from it.

From westward, after rounding Tanjong Pandanan the vessel should steer for Koeripan, bearing 090°, and then follow the directions given above.

Chart 1653c.

Coast.—Danger.—The northern part of the coast between Tanjong Pandanan and Tanjong Batoe (Batu) Gendang, 6½ miles southward, is mainly flat with a sandy beach, except for a steep part at the foot of a hill, 571 feet ($174^{m}1$) high, with a fairly prominent conical summit,

Charts 941b, 2759a.

Chart 1653c.

about 2 miles south-westward of Tanjong Pandanan. Southward of this hill the coast becomes steep and desolate. About midway between Tanjong Pandanan and Tanjong Batoe Gendang the coast rises sheer from the sea to an elevation of 1,454 feet (443^{m}2) and is of a whitish colour.

A rock, which dries and is steep-to, lies about half a mile west-south-westward of the white cliff mentioned above.

Tanjong Batoe Gendang, the south-western extremity of Lombok, is high and steep, and has a prominent, bare, perpendicular rock on it, in the form of a finger, 348 feet (106^{m}1) high; when seen from south-westward this rock cannot be distinguished from the land behind.

Directions for Straat Lombok.—From both northward and southward Straat Lombok can be easily identified by the high peaks of Bali and Lombok which can be seen from a distance of 80 miles in clear weather; Agoeng (page 179) at the eastern end of Bali, appears as a sharp peak, and Rindjani (Rinjani) (*see* below) in the northern part of Lombok, appears as a double peak showing above the other mountains.

Tidal streams.—*See* page 192.

LOMBOK.—The volcanic ridge, which extends from Java through the northern part of Bali, also continues in an easterly direction in the high chain of mountains in the northern part of Lombok. On the southern side this mountainous land descends regularly to a low, undulating, fertile hilly country, which again rises to a desolate chain of mountains running along the south coast of the island; this latter range, however, seldom attains an elevation of much over 1,000 feet (304^{m}8), except near Laboean Tring (*see* page 198).

In about the middle of the northern range is Rindjani (*Lat. 8° 25′ S., Long. 116° 27′ E.*), with an elevation of 12,350 feet (3,764^{m}3), and, except for Koerintji, in Sumatra, is the highest and largest volcano in the whole archipelago; it has four peaks, lying in a circle, with a fifth peak, from which smoke always issues, rising in the middle. Rindjani is covered with volcanic sand for the upper 2,000 feet (609^{m}6), otherwise the mountains of Lombok are thickly wooded; in clear weather it can be seen for a distance of about 80 miles. Close westward of Rindjani is a lake named Segara Anak, at an elevation of about 6,560 feet (1,999^{m}5).

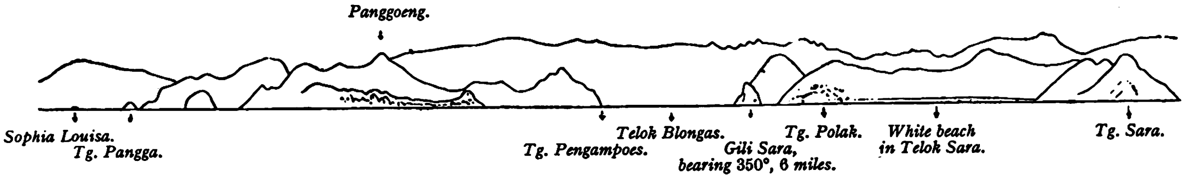
The native population of Lombok consists of two distinct races, the Balinese and Sassaks. The latter are nominally Muhammadans, and are more docile than the Balinese, who have oppressed them for centuries and still dominate them, but they are less enterprising and energetic. The Balinese dwell chiefly in the western part of the island and are greatly inferior in number. Agriculture is the main occupation, rice being the principal crop, and cotton is also grown in large quantities; tobacco, copra, indigo, and coffee are also exported.

For description of the western side of Lombok, *see* page 195.

Southern side of Lombok.—Coast.—The south coast of Lombok is rocky, steep, and except here and there in the bays, is inaccessible owing to the surf caused by the heavy ocean swell. The coast is indented and consists of high, dark points and short strips of sandy beach occasionally between. There are few noticeable features in the high, desolate land behind the coast, but the following may be useful:

Charts 941b, 2759a.

To face page 201.



Lombok, south coast. Approach to Telok Blongas.

(*Original dated* 1931.)

Chart 1653c.

a conical hill, 496 feet ($151^{m}2$) high, near the coast 2½ miles eastward of Tanjong Batoe Gendang; Panggoeng (Panggung), 1,116 feet ($340^{m}2$) high, on the western side of Telok Blongas, the highest part of a saddle-shaped mountain about 10 miles east-south-eastward of Tanjong Batoe Gendang; two noticeable trees on a ridge of hills 3 miles north-north-westward of the north-western corner of Telok Goembang (Gumbang), situated about 21 miles eastward of Panggoeng, the eastern tree having the shape of a windmill, and the other being a large round-topped tree.

About 1½ miles eastward of Tanjong Batoe Gendang is a sandy beach with a rocky islet, lying 3 cables offshore, and some rocks, which dry, in the vicinity. About 5 miles east-south-eastward of Tanjong Batoe Gendang is a small bay affording anchorage to vessels with local knowledge in the western part, provided the swell is not too heavy; the eastern part is foul. About 1½ miles south-eastward of the eastern entrance point of this bay is a conical rock, 50 feet ($15^{m}2$) high, on the narrow coastal reef; this rock being of a light colour, shows up plainly against the coast behind.

Chart 2732, plan of Telok Blongas and Silung Belanak.

Tanjong Pangga (Panga), about 10½ miles south-eastward of Tanjong Batoe Gendang (*Lat. 8° 50′ S., Long. 115° 50′ E.*), is formed by a spur from Panggoeng, on the western side of Telok Blongas. About half a mile west-north-westward of the point and close offshore is a small islet difficult to identify against the coast; eastward of the point are three rocks above water, lying close under the coast.

Off-lying danger.—Sophia Louisa rock, about one mile southward of Tanjong Pangga, is about 10 feet ($3^{m}0$) high and steep-to; the channel between the rock and the shore is clear of dangers.

Telok Blongas.—Dangers.—Telok Blongas is entered between the narrow, rugged tongue of land, about 1¼ miles eastward of Tanjong Pangga, and Tanjong Sara, 3¼ miles eastward. About half a cable south-eastward of the southern extremity of this tongue of land, is a rock, which dries, and is always marked by breakers; another rock, awash, lies 2¾ cables eastward of the same point, and is difficult to distinguish, as it does not always break.

Tanjong Sara is the southern extremity of a narrow neck of high land, and, although covered with vegetation, is noticeable owing to its reddish colour; the hilly ridge running down to the point terminates southward in a sharp peak, 467 feet ($142^{m}3$) high. A rocky islet, 172 feet ($52^{m}4$) high, lies on the edge of the steep-to reef, extending a short distance from Tanjong Sara, and a reef, which dries, lies 2½ cables south-westward of this islet. The rocky islet Gili Sara, 251 feet ($76^{m}5$) high, lies in the middle of the entrance to Telok Blongas, about 1¾ miles westward of Tanjong Sara. *See* view facing this page.

The shores of Telok Blongas are fringed by a narrow reef, that on the western shore being steep-to.

Between Tanjong Sara and Tanjong Polak, 1¾ miles west-north-westward, is a bight named Telok Sara, with a sandy beach on its northern side. The inner entrance, between Tanjong Polak and Tanjong Pengampoes (Pengampus), is about 1¼ miles wide. In the inner part of Telok Blongas are two bays, Telok Sawar in the north-western corner, and Telok Sépi in the north-eastern part.

Telok Sawar is only available for small vessels; its shores are

Charts 941b, 2759a.

Chart 2732, plan of Telok Blongas and Silung Belanak.

fringed by reefs, and a small detached reef, with a depth of 1¾ fathoms ($3^{m}2$) over it, lies 2 cables off the southern shore of the bay and about one mile north-westward of Tanjong Pengampoes. On the southern side of the entrance to Telok Sépi, and about one mile north-eastward of Tanjong Pengampoes, is Gili Lowang, a small islet, about 80 feet ($24^{m}4$) high, fringed by a narrow reef; there is a depth of 3 fathoms ($5^{m}5$) in the fairway of the channel between Gili Lowang and the point eastward. The depths in Telok Sépi decrease regularly from 9 fathoms ($16^{m}5$) at the entrance to 5 fathoms ($9^{m}1$) near the head, from which a mudbank, with depths of less than 3 fathoms ($5^{m}5$), extends about 5 cables.

Blongas village is situated about one mile inland, on Sungei Blongas, which flows out north-westward of Tanjong Batoe Goeloeng (Batu Gulung), the northern entrance point of Telok Sépi.

Anchorage.—Directions.—Anchorage may be obtained in a depth of 16 fathoms ($29^{m}3$), in the middle of Telok Blongas, or in Telok Sépi.

A vessel approaching Telok Blongas from westward may pass either northward or southward of Sophia Louisa rock (*Lat. 8° 56′ S., Long. 116° 00′ E.*); after passing this rock, in order to avoid the rock awash on the western side of the entrance to Telok Blongas, care should be taken that the southern side of Gili Sara does not bear more than 069° until Tanjong Pengampoes bears less than 350°; from abreast Gili Sara the vessel can proceed in mid-channel to the desired anchorage.

From southward, Tanjong Pengampoes in line with a prominent, green, conical hill about 2 miles north-westward, bearing 329°, leads to the entrance of the bay.

Telok Pengantap and Siloeng Belanak.—Telok Pengantap is entered between Tanjong Sara and Tanjong Kajoe (Kaju) Belé, a steep point about 2½ miles north-eastward. Half a mile north-north-eastward of Tanjong Sara is an islet, 174 feet ($53^{m}0$) high, and about 1½ miles north-eastward of the same point is a flat rock just above water.

Siloeng (Silung) Belanak is entered about 2 miles eastward of Tanjong Kajoe Belé. Gili Noesa (Nusa), a small wooded islet, lies in the middle of the entrance; owing to the heavy swell during the survey, the passage between this islet and the shore eastward was not examined, and it should not, therefore, be used. A rock above water lies just outside the reef, which dries, extending from Tanjong Mareseh, on the eastern side of the bay and about 2¾ miles eastward of Tanjong Kajoe Belé, and a noticeable rock, named Batu Balinsama, lies on the coastal reef at the head of the bay. A reef extends 3½ cables from the northern shore about 1¾ miles eastward of Tanjong Kajoe Belé.

Neither of the above bays affords good anchorage, except during the transition months; small vessels can lie fairly sheltered in the north-eastern part of Siloeng Belanak, in a depth of 7 fathoms ($12^{m}8$), sand, taking care to pass northward of Gili Noesa.

Off-lying danger.—A small reef, with a depth of 1¾ fathoms ($3^{m}2$) over it, lies about 2¾ miles southward of Tanjong Mareseh and 6 cables offshore; with a calm sea it is usually marked by ripples.

Chart 1653c.

Coast.—The coast between Tanjong Mareseh and Tanjong Boengkoelan (Bungkulan), about 15 miles east-south-eastward, is steep and

Charts 941b, 2759a.

Chart 1653c.

is indented by several small bays with sandy beaches. Telok Goembang (Gumbang) is entered between a point about 1¾ miles westward of Tanjong Boengkoelan and a point about 2 miles north-westward of the former ; it has an inlet named Telok Sebobo in its north-western corner ; it has not been examined, but it is reported to be inaccessible ; Gili Batoe, a prominent rock, 144 feet ($43^{m}9$) high, lies on the coastal reef extending about 3 cables eastward from the western entrance point.

Chart 2732, plan of Telok Awang

Telok Awang.—Telok Awang is entered between Tanjong Boengkoelan and Tanjong Sangoela (Sangula), a high, steep point, about 3¼ miles north-eastward, and is separated from Telok Goembang by a peninsula rising vertically from the sea on its southern side, and of which Tanjong Boengkoelan is its south-eastern extremity. Gili Saja, a steep-to rock above water, lies about 1½ cables offshore and about 6½ cables south-westward of Tanjong Boengkoelan (*Lat. 8° 58′ S., Long. 116° 24′ E.*) ; two other rocks above water lie near this point.

Anchorage may be obtained in the outer part of Telok Awang, in a depth of about 19 fathoms ($34^{m}7$), chiefly mud, free from southerly swell. The inner part of the bay is named Telok Batoe (Batu) Nampar, but it is so encumbered by reefs that it should be considered dangerous. There are inlets in the north-western and north-eastern corners of the bay, respectively, but both are almost entirely filled up by the coastal reef.

A great part of the western shore of Telok Awang is steep, but towards the head of the bay there are sandy beaches with only occasional steep parts, and in places the shore is marshy ; the southern part of the eastern shore again becomes steep, and is of a striking whitish colour. Kelor, an isolated hill, 279 feet ($85^{m}0$) high, 4¼ miles north-north-westward of Tanjong Sangoela, covered with vegetation and having a small round-topped tree on its summit, stands on the north-western shore of the bay ; Goenong Linoes (Gunong Linus), a conical islet, 195 feet ($59^{m}4$) high, lies on the coastal reef about half a mile eastward of this hill, and, owing to its light colour, stands out plainly against the land behind. There are some huts at the head of the inlet in the north-eastern corner of the bay.

Chart 3706, Alas strait.

Coast.—Dangers.—The south-eastern extremity of Lombok is formed by a peninsula, consisting of a plateau, about 220 feet ($67^{m}1$) high, rising abruptly from the sea ; the south coast of this peninsula is a striking whitish colour. The upper part of the plateau is wooded, but it is almost bare at Tanjong Ringgit, the eastern extremity. Between Tanjong Sangoela and an unexamined inlet, 4 miles eastward, there is a sandy beach along the foot of the cliffs ; farther eastward there is only a sandy beach between Tanjong Tjina (China) and Tanjong Pokki, about 2¼ miles and three-quarters of a mile, respectively, south-westward of Tanjong Ringgit, and again north-eastward of Tanjong Pokki.

Gili Kaliantan lies on the coastal reef about one mile eastward of Tanjong Sangoela, and about 2½ and 3½ miles, respectively, eastward of this point are two very noticeable, white, perpendicular rocks lying near the edge of the coastal reef. Off the western entrance point of the unexamined inlet the coastal reef extends about 8 cables

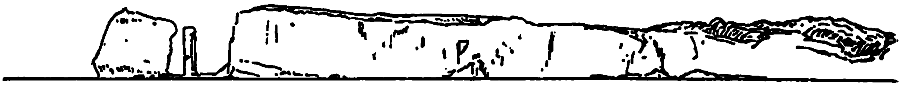
Charts 941b, 2759a.

Chart 3706, Alas strait.

offshore ; Gili Melajoe (Melayu), a rocky islet with a flat top, lies off the entrance to the same inlet. Gili Batoe (Batu), a low, dark rock, lies 7 cables southward of Gili Melajoe ; a reef, which dries, with a rock awash at its outer end, usually marked by breakers, extends nearly one cable from the south-western side of Gili Batoe, and is prolonged for a further half mile southward by a ridge with depths of less than 10 fathoms ($18^{m}3$) over it.

Eastward of the unexamined inlet the coastal reef practically disappears, but, as the tidal streams along the south coast of Lombok and from Straat Alas set fairly strongly on to the peninsula, it is advisable to give this stretch of coast a good berth. Pilaar rots (Pillar rock), 195 feet ($59^{m}4$) high, lying close offshore about 7 cables south-westward of Tanjong Tjina, is steep, covered with vegetation on top, and is joined to the coast by a reef, which dries.

Tanjong Ringgit (*Lat. 8° 52′ S., Long. 116° 36′ E.*) is steep and very prominent ; close off the point are a pillar rock and a large rock, about 65 feet ($19^{m}8$) high and very close together, named mutually Batu Milalang.



Tanjong Ringgit, bearing 150°.

(*Original dated* 1931.)

Chart 1653c.

Tidal streams off the south coast of Lombok.—The influence of the tidal streams from Straat Lombok is felt until close westward of Sophia Louisa rock ; those from Straat Alas up to 2 miles eastward of Telok Awang. The tidal streams from Straat Lombok are exceptionally strong, and may attain a rate of from 3 to 5 knots between Tanjong Batoe Gendang and Telok Blongas. From the middle of December to the middle of February a strong, constant east-going current was observed within the 100-fathom ($182^{m}9$) line between Telok Blongas and Telok Awang. In the bay there is an eddy or weaker stream.

Charts 3706, 1653c.

Northern side of Lombok.—The north coast of Lombok, between Tanjong Papak (page 195) and Straat Soengian, off the north-eastern side of Lombok, is low in some places, in others it is steep and rocky. Behind the coast is a relatively narrow strip of undulating land, which runs inland to the steep slopes of the volcanic range in the northern part of the island. The only danger off this coast is Batu Karang Tampas, with a depth of 1¾ fathoms ($3^{m}2$) over it, lying about 2¾ miles south-westward of Tanjong Agar Agar, a low, inconspicuous point about 10 miles north-eastward of Tanjong Papak.

As there are great depths close to the coast, there are few serviceable anchorages, and the various villages are seldom visited. Anchorage may be obtained close inshore off the villages of Loehoek (Luhuk), Sasait, Amor Amor, and Marba, which are situated along the western part of this coast. The anchorages off the villages of Bangsal Barat and Laboean Tjari (Labuan Chari), about 3 and 5½ miles, respectively, eastward of Tanjong Agar Agar, are not so good, as there are depths of 20 fathoms ($36^{m}6$), close inshore.

Charts 941b, 2759a.

Charts 3706, 1653c.

The influence of the tidal streams from Straat Lombok is felt as far eastward as Tanjong Agar Agar; those from Straat Alas until a short distance westward of Straat Soengian.

Charts 3706, 1696.

STRAAT ALAS.—Straat Alas is entered at its northern end between a line joining the northern extremity of Lawang (*see* below) and Tanjong Sarokaja (*Lat. 8° 22′ S., Long. 117° 10′ E.*), about 28 miles east-south-eastward. It separates Lombok from Soembawa (Sumbawa), and is frequently used by vessels instead of Straat Lombok; it is preferable to all the other passages between Kleine Soenda eilanden, for there are no dangers in it, the islands in the strait can be approached closely, anchorage may be obtained under the coasts of both Lombok and Soembawa, and the numerous prominent points and islands make it easy to fix the ship's position.

Chart 3706, Alas strait.

Currents and tidal streams.—The tidal streams in Straat Alas have a semi-diurnal character, but are influenced to such an extent by the monsoons in the area northward of Bali and Lombok and in the Flores sea, that, in the strength of the east monsoon a predominating south-going stream may be expected, and in the west monsoon a predominating north-going stream.

During the period of weak tides, in the week after the moon's quarter, the stream may run continuously in the same direction, i.e., south-going during the east monsoon and north-going during the west monsoon, the tidal influence being only just noticeable by periodical decreases in the rate of the stream. During the period of strong tides, in the week after new moon or full moon, the tidal streams and monsoon current may oppose and more or less balance each other, so that in the east monsoon there is little or no north-going stream, but a stronger south-going stream, and in the west monsoon the reverse. The maximum rate of these stronger streams is usually 4 knots, and is only exceeded when the moon's greatest declination occurs during the week after full moon or new moon, when a maximum rate of 5½ knots has been observed. Owing to these circumstances no fixed period can be given for the turning of the streams, but the following details may be useful:—

East monsoon.—During the east monsoon the strongest south-going stream of the day can be expected 6 hours after the moon's upper and lower meridian passage. About the time of these passages, dependent on the relative strengths of tidal and monsoon influences, either a weak north-going stream or slack water is experienced, or, when the monsoon current predominates, a weak south-going stream.

Under the Lombok shore there is an eddy stream between Tanjong Gali (page 207) and Tanjong Koeang (Kuang) Wahé; in Reede Laboean Hadji (page 211) it was observed that the north-going eddy runs from 6 hours before to one hour before the moon's passages, and the south-going eddy from one hour before to 6 hours after the moon's passages. The eddy is always weaker than the main stream.

Under the Soembawa shore the streams are very weak, especially in the area southward of Tanjong Beloesoen (Belusun) within Pulau Doea (Dua) and Sasait; the direction is the same as the main stream.

Charts 941b, 2759a.

Chart 3706, Alas strait.

West monsoon.—During the west monsoon the monsoon influence appears to be only felt in the northern part of the strait, and there is the following remarkable difference between the streams in this part and the southern part:—

Northward of the parallel of Tanjong Gali, in the deep channel eastward of Petagan, the strongest north-going streams of the day can be expected at the times of the moon's upper and lower passages. About 6 hours after these passages, depending on the relative strengths of the tidal influence and monsoon influence, there is either a weak south-going stream or slack water, or, if the monsoon influence predominates, a weak north-going stream.

Westward of the deep channel in the northern part of the strait, between Tanjong Kajangan and Tanjong Gali, the streams run with some strength one to 2 hours earlier, thus often causing an inset towards the Lombok shore. Eastward of the deep channel, close under the western side of Belang and also southward of that island, there is little or no stream, and sometimes an eddy.

Southward of the parallel of Tanjong Gali (*Lat. 8° 34′ S., Long. 116° 40′ E.*) the north-going stream runs from 4 hours before to the times of the moon's upper and lower passages; the south-going stream then runs until 8 hours after the moon's upper and lower passages. The maximum rate observed (during the week after full or new moon) was 3 knots for both north- and south-going streams; the rate of the south-going stream increases to 4½ knots only when the moon's greatest declination falls in the weeks after full or new moon. The maximum rate of 5½ knots, mentioned previously, never occurs during the west monsoon in the southern part of the strait.

During the west monsoon there is no eddy under the Lombok shore, but the stream there is weaker and changes 2 hours earlier than the main stream, so that in Reede Laboean Hadji the conditions are much the same as in the east monsoon, i.e., the north-going stream runs from 6 hours to one hour before the moon's passages, and the south-going stream from one hour before to 6 hours after these passages. Under the Soembawa shore the conditions are the same as for the east monsoon.

Winds.—In the South-east monsoon the wind blows strongly from southward during the greater part of the day, but subsides towards evening, when the land wind from Lombok begins. In the North-west monsoon variable and baffling southerly winds are often experienced in Straat Alas.

Chart 3706, Alas strait, northern entrance.

NORTHERN PART OF STRAAT ALAS.—Straat Soengian.—Dangers.—Straat Soengian (Sungian), entered at its north-western end about 20 miles east-south-eastward of Tanjong Agar Agar, separates Lawang and Soelat (Sulat), both low, uninhabited islands, covered with brushwood, from the north-eastern side of Lombok. These islands are separated from each other by a deep clear channel about 1¼ cables wide. Straat Soengian is safe and has a least depth of 9 fathoms ($16^{m}5$) in the fairway; a mid-channel course may be steered through when the strait is entirely open.

The south-western and western sides of Lawang are fringed by a reef. A bank, with a depth of 2¾ fathoms ($5^{m}0$) over it, near the

Charts 941b, 2759a.

outer end, extends about 7 cables north-westward from the north-western end of Lawang. A reef, with a depth of 2¾ fathoms (5^{m}0) over it, lies 1½ miles north-westward of the northern extremity of Lawang.

The fringing reef extends about 2 cables from the north-western extremity of Soelat. A narrow bank, with a depth of 5½ fathoms (10^{m}1) near its outer end, extends 2 miles south-eastward from the south-eastern extremity of Soelat.

Coast.—The east coast of Lombok from Straat Soengian to Tanjong Gali, a low point 13 miles south-south-westward, is low and backed by undulating hilly land, which rises and becomes steeper as it merges into the mountain complex of Rindjani (page 200).

Islets and dangers.—**Light.**—Petagan and Rotsige eilandje lie together on a bank, with depths of less than 10 fathoms (18^{m}3) over it, about 4½ miles southward of Soelat. Petagan is uninhabited, covered with low brushwood, and fringed by a reef which dries.

A light (*Lat. 8° 26′ S., Long. 116° 45′ E.*) is exhibited, at an elevation of 38 feet (11^{m}6), from a white iron structure, 26 feet (7^{m}9) in height, on the south-eastern edge of the reef fringing Petagan.

Good anchorage may be obtained by vessels with local knowledge southward of the light-structure, in a depth of 17 fathoms (31^{m}1), sheltered from sea and swell.

Southward of Petagan are four ledges of rock, which dry, with narrow channels carrying depths of from 4 to 8 fathoms (7^{m}3 to 14^{m}6) between them; two of the four Rotsige eilandjes lie together on the western ledge, and the other two lie on the northern and north-eastern ledges, respectively.

The channel between Petagan and Rotsige eilandjes on one side, and the eastern side of Lombok on the other, is free from danger.

The following shoals lie in the southern approach to this channel:—

Surat Castle, a shoal with a least depth of 3¾ fathoms (6^{m}9) over it, lies about 3½ cables offshore and about three-quarters of a mile south-westward of Tanjong Prepee (Prepe), the point of Lombok 2¾ miles westward of Petagan light-structure; a 6-fathom (11^{m}0) patch lies nearly half a mile eastward of this shoal. Atje shoal, 1½ miles southward of Tanjong Prepee, has a depth of 2¼ fathoms (4^{m}1) over it. A 5½-fathom (10^{m}1) patch lies three-quarters of a mile southward of the southern Rotsige eilandje, and about half a mile south-westward of this patch is a narrow ledge running parallel with the coast, with a least depth of 5 fathoms (9^{m}1) over it.

Vessels using the channel westward of Petagan and Rotsige eilandje should pass eastward of Surat Castle and Atje shoals.

Coast.—**Dangers.**—Lombok baai, entered about 3½ miles south-westward of Tanjong Prepee, is a pear-shaped basin where large praus find shelter and safe anchorage in both monsoons. The entrance is obstructed by a reef which dries, leaving only a narrow passage with a depth of 2 feet (0^{m}6) in it. A rock awash and a reef, with a depth of 3 feet (0^{m}9) over it, lie inside the basin. Lombok village, along the western and southern shores of the bay, is of little importance.

Leboer (Lebur), about one mile eastward of Tanjong Bonae, the southern entrance point of Lombok baai, is a nearly bare, sandy islet lying on the northern edge of a reef, which dries. Good anchorage may be obtained, in a depth of about 11 fathoms (20^{m}1), west-north-

Chart 3706, Alas strait, northern entrance.

westward of Leboer, taking care to avoid a rock which dries, lying about midway between Leboer and the coast westward.

Tanjong Kajangan, about 1¼ miles south-eastward of Tanjong Bonae, is 751 feet (228^{m}9) high, isolated and steep, with a noticeable knob on it. A reef, with a depth of 4¼ fathoms (7^{m}8) over it, lies about 2 cables eastward of Tanjong Kajangan. Two reefs, with depths of 2¾ and 3¾ fathoms (5^{m}0 and 6^{m}9) over them, lie about 6 cables south-eastward and 1½ miles southward, respectively, of Tanjong Kajangan.

There are several shoals in the southern part of the bight between Tanjong Kajangan (*Lat. 8° 30′ S., Long. 116° 41′ E.*) and Tanjong Gali, the positions of which can best be seen on the chart. Segara village stands about three-quarters of a mile north-westward of Tanjong Gali. Good anchorage may be obtained off this village, and it is comparatively calm here even when a heavy swell is running through Straat Alas.

North-western side of Soembawa.—The north-western coast of Soembawa from Tanjong Sarokaja (chart 1696) to abreast Belang, an island 24 miles west-south-westward, is comparatively low, with undulating hilly land behind which rises farther inland to a moderately high mountain range (*see* page 222).

Telok Badjoe (Baju) is entered about 2½ miles south-south-westward of Tanjong Perapat, which is situated about 3 miles westward of Tanjong Sarokaja. The inlet affords shelter to small vessels, in depths of from 4 to 7 fathoms (7^{m}3 to 12^{m}8), but its shores are fringed by reefs. Between Telok Badjoe and Boeroeng (Burung), an islet covered with vegetation, lying on the coastal reef 3½ miles south-westward, there are some detached reefs lying within three-quarters of a mile from the coast; reefs which dry extend nearly one mile west-south-westward from Boeroeng. Kaoen (Kaun) is an islet on which there are several round-topped trees, lying on the coastal reef, about 1½ miles south-westward of Boeroeng.

Boengin (Bungin) baai, entered between Kaoen and a point 1½ miles south-westward, is so encumbered by reefs as to be practically useless except for small vessels with local knowledge. Boengin (Bungin), an islet, lies 4 cables eastward of the western entrance point. There are several villages at the head of the bay, Laboean (Labuan) Alas being the principal. Several shoal heads lie northward and westward of the western entrance point; the outermost, with a depth of 1½ fathoms (2^{m}7) over it, lies about one mile northward of the western entrance point.

The coast between the western entrance point of Boengin baai and Tanjong Tano, 9½ miles west-south-westward, is clear of dangers outside the 3-fathom (5^{m}5) line, which lies fairly close to the coast. Laboe Beroe (Labu Beru) baai, south-eastward of Tanjong Tano, affords good anchorage, in depths of from 6 to 12 fathoms (11^{m}0 to 21^{m}9), sheltered northward by the islands Kalong, Namo, and Kenawa, the latter being 154 feet (46^{m}9) high. There are clear passages between these islands, and between them and the coast. Laboe Beroe (Labu Beru) village, on the southern shore of the bay and about 2 miles south-eastward of Tanjong Tano, is of no importance.

A rock, above water, lies close off the coast about 3½ cables southward of Tanjong Tano and there is a village on the coast about one mile southward of that point.

Charts 1653c, 1696, 941b, 2759a.

Chart 3706, Alas strait, northern entrance.

Tanjong Laboe Beroe (Labu Beru), three-quarters of a mile westward of Tanjong Tano, is the steep north-western extremity of a hilly promontory forming the western side of Laboe Beroe baai.

Off-lying islands and dangers.—Off the north-west coast of Soembawa is a chain of uninhabited islands, forming two groups. The north-eastern group, consisting of Kramat, Kamoedong (Kamudong), Ajar Tawar, Boengin (Bungin) Kelat, Seringgit, and Pandjang (Panjang), are low, and covered with brushwood; except for Pandjang, which is separated from Seringgit by a deep channel, all these islands lie on an extensive reef which dries, close within the 100-fathom ($182^{m}9$) line. A single tree, which is noticeable, stands on the eastern edge of the reef extending from the eastern side of Kramat, and close within it is a noticeable round bush. Pandjang is fringed by a narrow reef, which dries, continued southward and south-westward by an extensive bank; on the bank extending from the southern side there are numerous rocks within the 5-fathom ($9^{m}1$) line; within one mile southward of the western end of the island are two noticeable white sandy islets, fringed by reefs which dry, and a 2½-fathom ($4^{m}6$) patch lies about one mile south-westward of the western extremity.

A 3¼-fathom ($5^{m}9$) shoal lies about half a mile eastward of the eastern extremity of Pandjang and the depths are considerably less in the channel between that island and Seringgit than are shown on the chart.

Kalong (*Lat. 8° 30′ S., Long. 116° 52′ E.*), Namo, and Kenawa, in the south-western group, lie about 3 miles southward of the western end of Pandjang; Oelar (Ular), 6 cables westward of Kenawa, is a rocky islet covered with vegetation; Genang, 8 cables north-westward of Oelar, is a bare, rocky islet. Paserang and Belang, the south-western islands of this group, lie westward and south-westward of Tanjong Laboe Beroe, respectively; they are flat, thickly wooded islands almost entirely surrounded by a bank with depths of less than 10 fathoms ($18^{m}3$), on which are several patches with depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$) over them; Songi, a rocky islet 230 feet ($70^{m}1$) high, covered with vegetation, lies close off the north-eastern extremity of Belang and is very prominent.

Channel between the islands and Soembawa.—Between the above islands and the north-west coast of Soembawa there is a very good channel, with anchorage almost everywhere; it may be entered from north-eastward either between Kramat and Tanjong Perapat, or between Seringgit and Pandjang. The channel then runs fairly close along the northern sides of Kalong, Namo, and Paserang, passing southward of Kenawa and Oelar, or else vessels can pass between Tanjong Laboe Beroe and Paserang, and thence eastward of Belang; in the latter case the southern extremity of Belang should be given a wide berth, as there are some 3-fathom ($5^{m}5$) patches on the bank extending about 1¾ miles south-south-westward.

Vessels proceeding through the entire channel between these islands and Soembawa should be careful of the reefs under the Soembawa coast, and a course more towards the islands should be held. Near the north-eastern entrance the prominent sandy islet Bedil lies on a reef, which dries, nearly in the middle of the channel. The passage northward of this reef is recommended, as it is clear except for a 2¾-fathom ($5^{m}0$) patch 6 cables westward of Bedil; in the passage

Charts 1653c, 1696, 941b, 2759a.

Chart 3706, Alas strait, northern entrance.

south-eastward of Bedil are two patches, with depths of 3 feet ($0^{m}9$) and 2½ fathoms ($4^{m}6$) over them, respectively, lying 6½ cables eastward and 5 cables southward of Bedil.

The low islets Boeroeng, Kaoen, and Boengin, lying on the coastal reef extending from the Soembawa coast south-eastward and southward of Seringgit, are noticeable marks when navigating this channel; Koen and Boengin are inhabited.

Chart 3706, Alas strait.

Western side of Soembawa.—Aspect.—The west coast of Soembawa, between Tanjong Laboe Beroe (*Lat. 8° 31′ S., Long. 116° 49′ E.*) and Tanjong Mangkoen (Mangkun), 30 miles southward, consists of high hilly land, spurs from which form numerous steep, rocky points. Mantar gebergte, between Tanjong Laboe Beroe and Tanjong Beloesoen (Belusun), 10 miles south-south-westward, have no noticeable peaks, but thence to Tanjong Djelengnja (Jelengnja) 10½ miles southward, there are several prominent hills near the coast; the most striking of these are Suikerbrood, a hill on the northern entrance point of Kertasari baai, in the form of a sugar loaf, 540 feet ($164^{m}6$) high, situated about 5 miles southward of Tanjong Beloesoen, and Poetoeh (Putuh) Batu, 1,575 feet ($480^{m}1$) high, at the head of Taliwang baai, situated 5 miles south-eastward of Suikerbrood.

Coast.—Immediately southward of Tanjong Laboe Beroe is a wide bay, fronted by Paserang and Belang, and comparatively free from swell even with southerly and south-westerly winds. A 5-fathom ($9^{m}1$) patch lies about 4 cables off the southern entrance point of this bay, just within the 10-fathom ($18^{m}3$) line, and about one mile southward and about 4 cables offshore is a 2¾-fathom ($5^{m}0$) patch. A 3½-fathom ($6^{m}4$) patch lies nearly one mile north-north-eastward of Tanjong Beloesoen with irregular depths in the vicinity. A small islet lies close offshore about 2 miles south-eastward of Tanjong Beloesoen, and about one mile farther southward is Sarang (Lawang), 403 feet ($122^{m}8$) high, connected to the coast by a reef.

Pulau Doea (Dua), two rocky islets covered with vegetation, lie about 1½ miles south-westward of Tanjong Beloesoen. Sasait, 3¾ miles southward of Pulau Doea and also covered with vegetation, rises sheer from the sea to an elevation of 145 feet ($44^{m}2$).

Chart 3706, plan of Kertasari and Taliwang bays.

SOUTHERN PART OF STRAAT ALAS.—Kertasari baai.—Taliwang baai.—Kertasari baai, entered between the point dominated by Suikerbrood and Tanjong Biri, about 1¾ miles south-south-eastward, affords anchorage, in depths of from 6 to 10 fathoms ($11^{m}0$ to $18^{m}3$), sand and mud, but southerly and south-westerly winds quickly raise a heavy swell.

Taliwang baai, entered between Tanjong Balat, a prominent point, half a mile southward of Tanjong Biri, and Tanjong Bero, a steep-to point about 2½ miles southward, affords better shelter than Kertasari baai. A reef, with a depth of 4½ fathoms ($7^{m}8$) near its outer end, extends about 3 cables southward from Tanjong Balat. There are two islets in the south-eastern part of the bay, Poejoeng (Puyung) and Kenata; foul ground extends about 1½ cables from the eastern side of Poejoeng, and Kenata is connected to the coast by a reef. Laboean (Labuan) Balat village is situated in the northern part of the

Chart 3706, plan of Kertasari and Taliwang bays.

bay, and a small pier extends over the coastal reef here. The anchorage off Laboean Balat village is known as Reede Taliwang and is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij; although open to southerly winds there is less swell here than in the south-eastern part of the bay, where Laboean (Labuan) Lalar village is situated.

Chart 3706, Alas strait.

Coast.—The coast between Tanjong Bero and Tanjong Djelengnja, 2 miles south-westward, is bold and steep-to, thence to Tanjong Benéte, about 2¾ miles farther, there is a low strip of coast fringed by a reef which extends as much as 5 cables offshore. Between Tanjong Benéte (*Lat. 8° 52′ S., Long. 116° 44′ E.*) and Tanjong Maloh, 2½ miles southward, there is a remarkable inlet, with depths decreasing regularly from 18 fathoms ($32^{m}9$) at the entrance to 12 fathoms ($22^{m}0$) at the head; when entering the northern side should be held, as a reef, which dries, extends from the southern side.

Tanjong Maloh, when seen from northward or southward, is easily identified by the peculiar shape of a hill on it, 932 feet ($284^{m}1$) high; when seen from westward this hill is not particularly striking. In the bay southward of Tanjong Maloh there is good anchorage, in a depth of 10 fathoms ($18^{m}3$).

Maloh from southward.

(Original dated prior to 1934.)

Tanjong Amat, about 3½ miles southward of Tanjong Maloh, can be identified by the light yellow rocks on its western side, and by Geli, 1,152 feet ($351^{m}1$) high, about half a mile inland; close westward of Geli is another noticeable summit, 489 feet ($149^{m}0$) high.

Tanjong Mangkoen (Mangkun), the south-western extremity of Soembawa, is very prominent and has a table hill, of the same name, 902 feet ($274^{m}9$) high, on it. The coast from Tanjong Benéte to Tanjong Mangkoen has the same character throughout, lofty and broken, furrowed by dark ravines with strange crags and precipices, with sandy beaches in the bays between the steep, rocky points.

Eastern side of Lombok.—The east coast of Lombok between Tanjong Gali (page 207) and Pidjoet (Pijut) baai, about 16 miles south-south-westward, is generally low, with steep sides in places. The hinterland is formed by the relatively low, hilly plain mentioned on page 200, which extends from the northern range of high volcanic mountains to the desolate hilly land along the southern coast. From Pidjoet baai to Tanjong Ringgit, about 7 miles south-eastward, the coast is high and rocky.

Except for a 3¼-fathom ($5^{m}9$) patch about 8½ miles south-south-westward of Tanjong Gali and 8 cables offshore, there are no dangers between that point and Laboean Hadji, about 10 miles south-south-westward; the depths decrease regularly towards the coast.

Chart 3706, plan of Labuan Haji road.

Reede Laboean Hadji.—Beacons.—Reede Laboean Hadji (Labuan Haji) is bounded by the arc of a circle drawn from the Custom house flagstaff, with a radius of one mile. The roadstead does not afford very safe anchorage during the South-east monsoon, as a strong southerly wind blows from about 0900 until late in the middle of the day. In the drying coastal reef off Laboean Hadji (Labuan Haji)

Charts 1653c, 1696, 941b, 2759a.

Chart 3706, plan of Labuan Haji road.

village there is an opening leading to a basin, with depths of from 4 to 7 feet ($1^{m}2$ to $2^{m}1$), affording good shelter for small craft; the entrance is marked by a white beacon surmounted by a ball on the north-eastern side, and two black beacons each surmounted by a cone, on the south-western side. Large vessels anchor eastward of the entrance to this basin, in a depth of about 8 fathoms ($14^{m}6$). The village can be readily identified from Straat Alas by a red-roofed house, off which are the ruins of a smaller pier. A flagstaff stands near the harbour office about 1¼ cables south-westward of the red-roofed house. The loading and discharging of cargo is often carried out with some difficulty.

Laboean Hadji village (*Lat. 8° 42′ S., Long. 116° 34′ E.*) is almost entirely inhabited by Chinese and natives; copra is the principal export. There is telephonic communication with Ampenan and other places in the district. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Fresh provisions are usually obtainable.

Chart 3706, Alas strait.

Coast.—The coast between Laboean Hadji village and Sungei Batoe (Batu) Belajar, 4½ miles south-south-westward, is fringed by a reef which dries, except for the space of about one mile in the vicinity of the mouth of this river, where a bank, with depths of less than 3 fathoms ($5^{m}5$), extends about half a mile offshore. Tanjong Koeang (Kuang) Wahé, 3¾ miles south-south-westward of Labuan Hadji village, is a low, sloping point between two rocky parts of the coast, and is not particularly noticeable. Batu Belajar, a rock 16 feet ($4^{m}9$) high, lies close to the coast southward of the mouth of Sungei Batoe Belajar; a prominent tree stands near the coast abreast this rock.

Chart 3706, plan of Pijut bay to Tanjong Ringgit.

The bay between Batu Belajar and Tanjong Ringgit is separated from the north-eastern part of Telok Awang (page 203) by a low isthmus about 1¾ miles wide, named Pangorossang, connecting the peninsula forming the south-eastern extremity of Lombok to the main part of the island. The greater part of the bay is encumbered by several reefs which dry and shoals, the position of which can best be seen on the chart; there are no dangers outside the 10-fathom ($18^{m}3$) line. Only the northern part is inhabited.

In the northern part of the bay, off Tandjoeng Loear (Tanjung Luar) village, situated 1¼ miles south-westward of Batu Belajar, there is better anchorage than at Reede Laboean Hadji, in depths of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$). The low islets Kera, Maringki, Bembé, Koerapoe (Kurapu), Datang, and Gili besar lie on the southern side of this anchorage on large reefs which dry, extending about 2 miles eastward and 1½ miles north-eastward of Tanjong Pamelawang, situated 3½ miles south-westward of Batu Belajar; Maringki and Gili besar have steep, rocky sides. Pidjoet baai, close westward of Tandjoeng Loear, can only be entered by boats at high water, as the narrow entrance is barred by the drying coastal reef. Kedomé village is situated on the western side of Pidjoet baai and Pidjoet (Pijut) village on the north-eastern side.

There is a channel between the drying reefs, leading south-westward of Kera (*Lat. 8° 49′ S., Long. 116° 31′ E.*) and northward of Datang, Gili besar, and Tanjong Pamelawang, to Pangorossang; a

Charts 1653c, 1696, 941b, 2759a.

Chart 3706, Plan of Pijut bay to Tanjong Ringgit.

rock, with a depth of 7 feet (2^{m}1) over it, lies nearly in mid-channel and 4 cables northward of Datang.

Lehok Djoekong (Jukong) lies in the south-western corner of the bay, and the entrance is reached by a channel free from dangers, with depths of from 12 to 22 fathoms (22^{m}0 to 40^{m}2) in it, leading southward of the islets and reefs extending eastward from Tanjong Pamelawang. Pulau Doea (Dua), two bare rocks, about 132 feet (40^{m}2) high, lie on the coastal reef about one mile southward of Tanjong Pamelawang and on the north-western side of the entrance to Lehok Djoekong; Oppa, on the opposite side, and about half a mile farther southward, is a low islet. A narrow channel, shoaling gradually southward, leads from here to Lehok Djoekong.

Lehok Soenoeh (Sunuh) and Lehok Poeloe (Pulu) Tiga, on the southern side of the bay between Tanjong Ringgit and Tanjong Tjoemi (Chumi), 3¾ miles north-westward, both afford good anchorage, in depths of from 11 to 16 fathoms (20^{m}1 to 29^{m}3); Lehok Poeloe Tiga derives its name from three islets lying on reefs on the eastern side.

Chart 3706, Alas strait.

Directions for Straat Alas.—Approaching from southward, Straat Alas may be identified by the high, rugged land of the south-western part of Soembawa, and the plateau forming the south-eastern part of Lombok. From northward Rindjani and the high north-western part of Soembawa are noticeable, and the islands lying under the coasts of Lombok and Soembawa will also be visible. For vessels approaching from westward the route through Straat Soengian, and thence between Petagan and Lombok (see page 207), is shorter than eastward of those islands. Vessels from eastward can make use of the channel between Seringgit and Pandjang (*see* page 209), and thence continue southward of the latter (*see* page 210).

Chart 1696.

SOEMBAWA.—Soembawa (Sumbawa) is an island consisting mainly of volcanic, very irregular, mountainous land, moderately covered with vegetation, and has a barren appearance during the east monsoon; it affords few good landmarks for vessels passing northward or southward of it. The western half is mostly formed by a plateau from about 1,600 to 2,300 feet (487^{m}7 to 701^{m}0) high, from which rise higher ridges and peaks, some of over 4,000 feet (1,219^{m}2), and intersected by deep, fantastic ravines. The peninsulas forming the northern side of Saleh baai and the eastern end of Soembawa are occupied by more detached mountains and ridges, to a great extent extinct volcanoes, but, owing to their resemblance to one another, they are difficult to identify from seaward. Of these Tambora (*see* page 222), which occupies the centre of the first-mentioned peninsula and is the only known active volcano, is the highest and most remarkable, with its gigantic crater 5 miles in diameter; during the eruption of 1815 about 12,000 of the inhabitants perished and a great part of the island was devastated.

There are no rivers of any importance in Soembawa, and the mouths of the streams are only navigable for praus, although they mostly contain water even in the dry season. Forests and cultivated land are generally only found in the valleys, and particularly on the northern and western slopes of Tambora (*Lat. 8° 15′ S., Long. 117° 59′ E.*).

Except in the deeply-penetrating bays the coasts are generally

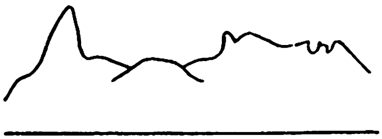
Charts 1653c, 941b, 2759a.

steep-to, affording little space for anchoring; there are no known dangers outside the 100-fathom (182m9) line, which lies close off the coast. It is possible, however, that submarine volcanic disturbances may be taking place in more unfrequented places along the coast; the last eruption of Tambora (*Lat. 8° 15′ S., Long. 117° 58′ E.*) occurred in 1895.

For administration purposes the island is divided into the provinces Soembawa, Sanggar, Dompo, and Bima, each ruled by a Sultan under the control of the Netherlands Government. The inhabitants can speak no Malay, and live chiefly by agriculture and breeding cattle; trade is carried out by people from other islands, who only dwell along the coasts, and also by Chinese.

SOUTHERN SIDE OF SOEMBAWA.—Aspect.—The tolerably high, desolate, mountainous land affords few noticeable features for vessels proceeding along the south coast of Soembawa; the few more or less noticeable peaks mentioned hereafter are often difficult to identify from the various rugged mountain ranges, which all present somewhat the same appearance.

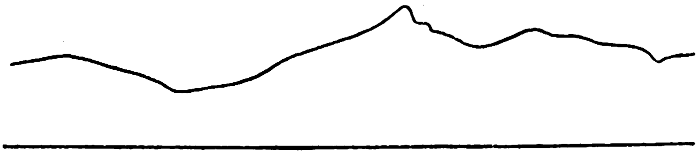
The mountains near the coast between Tanjong Mangkoen and Tanjong Talonan, 18½ miles east-south-eastward, are only serviceable to vessels navigating close along the coast; the summit 3,441 feet (1,048m8) high, about 10½ miles east-north-eastward of Tanjong Mangkoen, is noticeable owing to its conical shape. Far inland, about 16 miles north-eastward of this summit, is Oetok (Utok), a noticeable conical peak, 3,336 feet (1,016m8) high, at the western end of a rugged ridge; this peak is only visible on a north-north-westerly bearing, when it is seen between the double-peaked Ginaleh, 8 miles south-south-eastward, and a summit, 2,667 feet (812m9) high, about 2½ miles westward.



Oetok from south-south-eastward.

(*Original dated* 1947.)

Seboe (Sebu), near the coast about 12 miles south-eastward of Ginaleh, is not particularly noticeable; Liang, about 1¼ miles south-eastward of Seboe, has a rounded summit, with perpendicular sides in places. Dodo, about 5 miles northward of Seboe, is the highest peak of a ridge running in a north and south direction. The mountainous land continues eastward of Liang as far as Telok Panas, a distance of about 18 miles, when the high ridges lie some distance inland, and the coast has a steep and desolate appearance. Thence eastward there are no noticeable landmarks for vessels passing at any distance from



Dodo from south-westward.

(*Original dated* 1947.)

Chart 1696.

the coast; Tambora is visible over the mountainous land southward of Saleh baai.

Tidal streams.—Few particulars of the tidal streams off the south coast of Soembawa are available, but they have not been observed to run at a great rate. Westward of Tanjong Talonan, near the western end of Soembawa, and eastward of Toro Langoedoe (Langudu) (page 219), near the eastern end, the tidal streams from Straat Alas and Straat Sapeh, respectively, will be felt.

Chart 3706, Alas strait.

Coast.—The coast for a distance of 6½ miles east-south-eastward of Tanjong Mangkoen is hilly and is fronted by a sandy beach; a green hill, 390 feet ($118^{m}9$) high, lies close inland at the eastern end of this stretch of coast, and thence the aspect changes, spurs from the mountainous land extending down to the sea. About 4 miles east-south-eastward of Tanjong Mangkoen is another green hill, 508 feet ($154^{m}8$) high, about 1¼ miles northward of which is a table mountain 1,335 feet ($406^{m}9$) high.

Tanjong Tatar (*Lat. 9° 04′ S., Long. 116° 54′ E.*), about 11 miles east-south-eastward of Tanjong Mangkoen and the western entrance point of Telok Tatar, is steep; a rock which dries, lies close off the point. Tatar, a mountain close northward of the point, has two peaks, the higher of which has an elevation of 1,702 feet ($518^{m}8$); Sekongkang, 1¼ miles northward of the head of Telok Tatar, is difficult to distinguish from the surrounding mountains.

Tanjong Talonan is steep but not high. Sungei Talonan flows into Telok Talonan, a small bay eastward of the point, and in the wet season boats can cross the bar of the river at high water; towards the end of this season praus come here to load wood, and lie behind a tongue of land that projects across the mouth. A rock, named Gili Terata, lies on the coastal reef off the eastern entrance point of the bay. Vessels with local knowledge can anchor off Telok Talonan, but the bottom is steep within the 20-fathom ($36^{m}6$) line, and they lie badly owing to the backwash of the sea, which beats heavily against Tanjong Talonan. About 2 miles eastward of Telok Talonan is a small reef, which dries, lying close offshore.

Tanjong Gerantah, 7½ miles eastward of Tanjong Talonan, is steep; a rock, visible 5 miles from westward, lies close off the point. Anchorage may be obtained by vessels with local knowledge close to the coast in the small bay north-eastward of Tanjong Gerantah, in a depth of 30 fathoms ($54^{m}9$), sand; a few streams flow out here. Entering the bay vessels should be careful of a whirlpool, the edges of which are usually marked by ripples.

Telok Lamar, the entrance to which is 2 miles north-north-eastward of Tanjong Gerantah, is a small bay into which Sungei Lamar discharges; boats can cross the bar of the river at half-tide, and a tongue of land projects across the mouth, behind which praus lie to load wood. In calm weather there is anchorage for vessels with local knowledge off Telok Lamar, in a depth of 10 fathoms ($18^{m}3$), free from ground swell during the west monsoon.

North-eastward of Telok Lamar the coast forms a bight, about 8 miles wide, named Telok Lampoei (Lampui), which has a sandy beach along its shore. Sungei Amok flows out in the north-western corner, and its mouth can be distinguished by a white rocky point

Charts 1653c, 941b, 2759a.

Chart 3706, Alas strait.

on its western bank ; vessels with local knowledge can obtain anchorage off this river, but there is nearly always a swell.

Eastward of Telok Lampoei the coast resumes its usual character, steep spurs from the mountains extending down to the sea, with sandy beaches between the points. Telok Lampit and Telok Sarang are separated by Tanjong Seboe (Sebu), a steep point about 11½ miles eastward of Tanjong Gerantah. Tanjong Dodo, the eastern entrance point of Telok Sarang is steep, and a small rock above water lies off it.

About 3 miles eastward of Tanjong Dodo is a small bay affording good anchorage for vessels with local knowledge during the transition periods between the monsoons. The eastern entrance point of this bay is hollowed out to an archway, and is open in a south-westerly and north-easterly direction ; there are two rocks, which dry, not always marked by surf, near this point. The anchorage is in depths of from 11 to 15 fathoms ($20^{m}1$ to $27^{m}4$), with the points of land westward in line and the arch open, taking care to avoid the two drying rocks.

Tanjong Lessek (*Lat. 9° 02′ S., Long. 117° 28′ E.*) lies about 5 miles eastward of Tanjong Dodo, and Sungei Dodo flows out at the former point ; about 1¼ miles farther eastward is the mouth of Sungei Lessek, both streams flowing through noticeable ravines with steep sides. Close eastward of the mouth of Sungei Lessek is a rock awash lying nearly 2 cables offshore, and about 5 miles eastward of Tanjong Lessek is a noticeable, pyramidal rock on the narrow coastal reef, with a rock, which dries, close eastward of it. About 10 miles east-north-eastward of Tanjong Lessek is a prominent, steep point, almost bare of vegetation ; the outer end of this point is low and there are some rocks on the coastal reef. About 4 cables north-eastward of this point, and one cable offshore, is a rock awash.

The coast continues to be steep as far as the mouth of Sungei Panas, about 13 miles east-north-eastward of Tanjong Lessek, reaching its highest point in a mountain, 1,131 feet ($344^{m}7$) high, close westward of the mouth of this river ; from southward and eastward this mountain is noticeable owing to its conical shape. Eastward of Sungei Panas the mountains lie farther inland, with a wooded plain between them and the coast, fronted by a sandy beach. In the north-eastern part of Telok Panas are two steep points affording good landmarks ; the eastern entrance point of this bay is low and sandy. There is good anchorage for vessels with local knowledge off the mouth of Sungei Panas, in a depth of 15 fathoms ($27^{m}4$), sand ; close eastward of a small stream eastward of Sungei Panas there is an inlet in the coastal reef and a sandy beach, affording a good landing place.

Eastward of Telok Panas spurs from the mountains again extend down to the coast, which here recedes 2 miles, forming a bay, the eastern entrance point of which is steep ; on the coastal reef at the head of the bay is a rock, 46 feet ($14^{m}0$) high. Satong, 1,407 feet ($428^{m}8$) high, north-westward of the bay, shows several peaks when seen from southward. Tanjong Mata, nearly 15 miles eastward of the mouth of Sungei Panas, is a noticeable, steep point, and Sungei Baroe (Baru) flows out about 1½ miles northward of it ; a small reef, with a depth of 2½ fathoms ($4^{m}6$) over it, lies about 3¾ cables south-south-eastward of the mouth of this river. Northward of Tanjong Mata is a stretch of desolate mountainous land, the highest peak, 2,037 feet ($620^{m}9$) high, being noticeable when seen from eastward.

Charts 1696, 941b, 2759a.

Chart 3706, Alas strait.

Telok Baroe (Baru), entered about 7 miles north-eastward of Tanjong Mata, affords good anchorage in the north-eastern part during the South-east monsoon and transition periods, in a depth of 20 fathoms ($36^{m}6$), sand; the position of the anchorage is indicated by some coconut trees standing on the beach. A rock, which dries, detached from the coastal reef, lies off a slightly projecting part of the coast at the head of the bay. Tanjong Baroe (Baru), the eastern entrance point of Telok Baroe, situated about 15 miles east-north-eastward of Tanjong Mata, is steep; Pantjo (Pancho), a mountain 1½ miles northward of this point, is 1,771 feet ($539^{m}8$) high, and rounded.

Charts 2785, plan of Chempi bay, 1696.

Tjempi baai.—Dangers.—Tjempi (Chempi) baai, entered between Tanjong Baroe (*Lat. 8° 53′ S., Long. 118° 10′ E.*) and Toro Doro, 19½ miles eastward, extends about 17 miles north-north-eastward and is backed by high land. The following summits are noticeable: Doro Riwo, lying one mile from the western shore of the bay, and 17½ miles north-eastward of Tanjong Baroe, has three peaks; Doro Lodo, about 7 miles eastward of the head of the bay, also has three peaks, the northern of which is 2,424 feet ($738^{m}8$) high and conical, and there is a very prominent conical peak, 3,638 feet ($1{,}108^{m}9$) high, about 3¾ miles eastward of the southern peak; Doro Kangga, close northward of Toro Doro, has two summits. The following hills at the head of the bay, near the eastern shore and 11 miles northward of Toro Doro, are also noticeable when entering the bay: Doro Roemoe (Rumu), with a round-topped tree on its summit; Doro Rompé, about 2 miles west-north-westward of Doro Roemoe, with four peaks close together and a spur, named Donggo Woro, running down to the coast; Doro Toi, on the coast about three-quarters of a mile southward of Doro Rompé.

The shores of the bay are high where the spurs from the mountains extend to the sea, and low in other places. Telok Dompo, at the head of the bay, which is almost entirely occupied by a mud bank, has marshy shores. Several small rivers flow into the bay, the most important being Sungei Dompo, at the head of Telok Dompo, which is accessible for praus across the drying mudbank at high water, and Sungei Hoe-oe (Hu-u), in the southern part of the eastern shore, nearly 2 miles southward of Toro Hoe-oe (Hu-u), a point nearly 8 miles north-north-westward of Toro Doro.

Hoe-oe (Hu-u) village, situated about 1½ miles eastward of Toro Hoe-oe, on Sungei Hoe-oe, can be reached by landing eastward of the rocky point 1½ miles north-eastward of Toro Hoe-oe, but boats making for this landing place should exercise caution, as a number of rocks, which dry, practically invisible when covered, lie just within the 3-fathom ($5^{m}5$) line northward of the landing place.

Tjempi baai affords several good anchorages, sheltered from the swell. On the western side are two bights, Telok Poeri (Puri) and Telok Somila, separated by Toro Sahé, a prominent point with red cliffs, situated 4 miles north-westward of Tanjong Hoe-oe; Telok Poeri is entirely occupied by a reef which dries. Begroeide (Begruide), a rock covered with vegetation, 113 feet ($34^{m}4$) high, lies on the narrow coastal reef 5¾ miles south-westward of Toro Sahé, and is very noticeable from south-westward and north-eastward.

On the eastern side of the bay there is excellent anchorage north-

Charts 1696, 941b, 2759a.

Charts 2785, plan of Chempi bay, 1696.

ward of Batu Koeroeng Boeha (Kurung Buha), a reef extending halfway across the bay from Toro Hoe-oe, which acts as a breakwater. There are some rocks which dry near the outer edges of this reef, and at the western end the depths are very irregular up to the 10-fathom ($18^{m}3$) line, and vessels should, therefore, keep outside this depth when rounding the reef. There is a noticeable tree on the coastal reef nearly half a mile northward of Toro Hoe-oe.

Soera (Sura), an islet at the head of the bay, and about 7 miles north-north-eastward of Toro Hoe-oe, is a very prominent, wooded islet, 262 feet ($79^{m}9$) high, which can be easily identified from abreast Begroeide rots. Within this islet are two small bays, Telok Rango and Telok Adoe (Adu), separated from each other by a projecting ridge.

Chart 2785, plan of Chempi bay.

Directions.—From a position north-eastward of the south-western entrance point of Telok Poeri, the conical northern summit of Doro Lodo (*Lat. 8° 36′ S., Long. 118° 33′ E.*) in line with the summit of Pulau Soera, bearing 053°, leads into the inner part of Tjempi baai; when approaching from south-westward a vessel should keep south-eastward of this line so as to avoid the 5½-fathom ($10^{m}1$) patch lying 4 cables south-eastward of the south-western entrance point of Telok Poeri. Batu Koeroeng Boeha is usually marked by surf, but this does not necessarily indicate the edge of the reef; owing to the muddy state of the water caused by the numerous small rivers flowing into the bay, the reefs are seldom marked by discoloration. The tidal streams run fairly strongly in and out of the bay, but further particulars are lacking.

Chart 1696.

Coast.—Toro Loe (Lu), 2¾ miles eastward of Toro Doro, may be identified by a rock, on which is a white patch, lying on the reef extending a short distance from the point; two rocks above water lie 1½ cables off the unnamed point three-quarters of a mile westward of Toro Loe. Toro Koeta (Kuta), about one mile east-north-eastward of Toro Loe, is a steep point. Telok Lérèh, entered between Toro Koeta and Toro Tenawoe (Tenawu), 3½ miles east-north-eastward, has a steep shore varied by sandy beaches; Lérèh islet lies 2¾ cables south-westward of Toro Tenawoe, and a flat rock, just above water, lies on the edge of the coastal reef between the islet and the point. Ujong Wané, 3¼ miles east-north-eastward of Toro Tenawoe, is a sandy point, but the remainder of the points along this part of the coast are steep, with occasional sandy beaches between.

Doro Rasa, close to the coast about 4½ miles east-north-eastward of Ujong Wané, is a very prominent, bare mountain, 1,410 feet ($429^{m}7$) high, rising steeply from the sea; from westward it appears as an isolated half-sphere, but from eastward it is conical, with a dome-shaped summit of a ridge close to it on the landward side.

Charts 2785, plan of Waworada bay, 1696.

Eastward of Doro Rasa is the peninsula forming the southern side of Waworada baai, mostly occupied by rugged, mountainous land, the peaks of which are not always easy to identify. Nearly in the middle a ridge runs in a westerly and easterly direction, with three peaks named Doro Roenoeh (Runuh), Doro Nisah, and Doro Poesoeh (Pusuh), 1,580 feet ($481^{m}6$), 2,043 feet ($622^{m}7$), and 2,164 feet ($659^{m}6$)

Charts 941b, 2759a.

Charts 2785, plan of Waworada bay, 1696.

high, respectively; Doro Poesoeh is situated about 7½ miles eastward of Doro Rasa. The south coast of this peninsula is somewhat flatter than the coast westward. Batu Padjoe (Paju), 5½ miles eastward of Doro Rasa, is a steep part of the coast formed by a rugged spur from the mountains. The coast in the vicinity of Toro Moea (Mua), 3¼ miles east-south-eastward of Batu Padjoe, is also very steep; there are some rocks on the coastal reef extending a short distance from Toro Moea, and the sea usually breaks heavily on them.

There are no good anchorages between Toro Doro and Toro Moea, as there is no protection from the heavy swell usually found along this coast. Telok Moea (Mua), a small bay immediately eastward of Toro Moea, affords some shelter; when entering attention should be paid to the tidal stream setting across the entrance. Toro Taä, the eastern entrance point of Telok Moea, is 281 feet (85^{m}6) high, steep and narrow, bearing some resemblance to a lion lying down. There are no other anchorages between Telok Moea and Toro Langoedoe (Langudu), the eastern point of the peninsula, situated about 5½ miles eastward.

Nisa Sido (*Lat. 8° 50′ S., Long. 118° 58′ E.*) is a bare islet lying on the extremity of a reef extending about 2 cables from the coast about 1¼ miles south-westward of Toro Langoedoe; the islet has two summits, the northern and highest being 183 feet (55^{m}8) high, and between them is a deep cleft with perpendicular sides, through which the sea breaks with violence.

Toro Langoedoe is a steep, prominent point, particularly from south-eastward, when three small, conical peaks can be seen, increasing in elevation landwards. Eastward of the point are two rocks, which dry, the outer and larger lying about 2 cables offshore, and there is often a strong current here. The outer rock is marked by surf, which forms half a cable outside it; the inner rock dries later and is seldom marked by surf and never by discoloration.

Chart 2785, plan of Waworada bay.

Waworada baai.—Toro Sido, 1¾ miles northward of Toro Langoedoe and the southern entrance point of Waworada baai, is steep, especially on the eastern side, where there is a depth of 9 fathoms (16^{m}5) close off it; close within the point is a hill 150 feet (45^{m}7) high. Toro Djampang (Jampang), about 2¾ miles north-north-eastward of Toro Sido and the northern entrance point of the bay, is also steep. Waworada baai extends in a westerly direction, and affords good anchorage everywhere; it is backed by mountains, with flat land generally at the foot of the slopes. The mountains on the peninsula forming the southern side of the bay have been already described on page 218. On the northern side, westward of Telok Tanggah, are Doro Roepeh (Rupeh), Doro Patoeah (Patuah), and Doro Roempoe (Rumpu); of these Doro Patoeah is the most noticeable owing to its conical peak and a dark wood extending from the summit along the eastern slope. Doro Nioeh (Niuh), nearly 2 miles west-south-westward of Doro Patoeah, is particularly striking, as it stands alone in a large plain and has a dark clump of high trees on its summit. Doro Simposai, at the head of the bay, has a sharp, conical summit. Doro Taporada and the other summit close northward of Simposai are not particularly noticeable.

The only permanent villages are along the northern shore; Koro

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Chart 2785, plan of Waworada bay.

Djangan (Jangan), Roepeh (Rupeh), and Keroemboe (Kerumbu) stand at the foot of the mountains hidden behind coconut trees, from which rice fields extend to the marshy coast westward of Toro Roentjoeh (Roenchuh), situated 7½ miles westward of Toro Djampang. Waworada village, 3½ miles west-north-westward of Toro Roentjoeh, stands in similar surroundings, but is visible from seaward. The hamlets along the southern shore are only inhabited temporarily during the harvest by natives from the north coast of Soembawa.

During June, 1906, it was observed that an east wind began to blow in Waworada baai, about 0900, and blew strongly until about 1700, causing a choppy sea. During the nights calm usually prevailed, or there was a light north-easterly breeze.

The tidal streams in the bay are weak.

The southern shore of Waworada baai between Toro Sido and Toro Pangkadjarat (Pangkajarat), about 3 miles north-westward, is indented by Telok Sido and Telok Pangkadjarat (Pangkajarat), which are separated by Toro Tengani, on which is a prominent red conical hill, 262 feet (79^m9) high. Toro Pangkadjarat (*Lat. 8° 46′ S., Long. 118° 55′ E.*) is the north-eastern extremity of a ridge, on which there are two yellowish hillocks, extending from a conical hill, 675 feet (205^m7) high, about 7 cables south-westward.

The northern shore of Waworada baai extends north-westward from Toro Djampang, forming Telok Tanggah, in which is a sandy beach broken only in a few places by steep parts and fringed by a steep-to coral reef; Toro Tjengeh (Chengeh), the western entrance point of Telok Tanggah, situated about 5½ miles north-westward of Toro Djampang, is a narrow tongue of land rising to an elevation of 208 feet (63^m4). Between Toro Tjengeh and Toro Roentjoeh, the coast is high and steep for the greater part, with a ridge of hills close to it, the highest summits being Doro Ngadoeh (Ngaduh) and Doro Koro Djangan (Jangan); Toro Roentjoeh should not be approached within the 10-fathom (18^m3) line, as a reef, with a depth of 3 feet (0^m9) over it, lies close westward of the point.

Toro Bali, on the southern shore, 4¼ miles westward of Toro Pangkadjarat, is a low point; the coast thence westward is low, marshy, and fringed by a reef, which partly dries. Nisa Kekah, a rock, 6 feet (1^m8) high, lies about 3 cables offshore and just within the 10-fathom (18^m3) line, about one mile west-north-westward of Toro Bali. Nisa Doea (Dua) are two rocks, 42 feet (12^m8) high, and of a reddish colour on their northern sides, lying on the coastal reef about 2½ cables offshore and within half a mile westward of Nisa Kekah; a rock above water lies on the edge of the coastal reef about one cable north-eastward of the eastern rock of Nisa Doea, and another rock above water about 1¼ cables west-south-westward of the same rock.

The coast between Toro Roentjoeh and Toro Waworada, about 4½ miles west-north-westward, forms a bight, the shore of which is mostly marshy and fringed by a reef which dries; in the western part of this bight are two inlets, Telok Rimba and Telok Lama, separated from each other by Toro Paroppa, a low point 1½ miles eastward of Toro Waworada.

Nisa Bea, an islet, 222 feet (67^m7) high, lies about 1¼ miles westward of Toro Roentjoeh; a small reef, with a depth of 2 fathoms (3^m7) over it, lies about 4 cables east-north-eastward of the northern extremity of

Chart 2785, plan of Waworada bay.

Nisa Bea. Nisa Dorah, 208 feet ($63^{m}4$) high and wooded, situated about 2 miles westward of Nisa Bea, is fringed by a steep-to reef with some rocks above water on its southern side; a steep-to reef, with a depth of 3 feet ($0^{m}9$) over it, lies 6 cables westward of the north-western extremity of Nisa Dorah. Nisa Tanah, 173 feet ($52^{m}7$) high, and wooded, lies on the reef extending 7½ cables southward from Toro Waworada, and southward of it is a conical rock, 60 feet ($18^{m}3$) high, named Nisa Dongi.

Between Tora Waworada and Toro Ladjoh (Lajoh), about 3 miles south-westward, is a bight, divided into two parts, named Telok Doroh and Telok Ladjoh (Lajoh); a reef, which dries, extends as much as 6½ cables from the shores of this bight, and there are some detached reefs outside it. Nisa Gendah, an islet, 75 feet ($22^{m}9$) high, and covered with reeds, with a yellow summit, lies on the coastal reef about 1½ miles westward of Toro Waworada. Nisa Soera (Sura), 306 feet ($93^{m}3$) high, and wooded, lies about 6 cables eastward of Toro Ladjoh; there is a small fishing village on the northern side of this island.

On the southern shore of Waworada baai, about 6½ miles westward of Toro Bali (*Lat. 8° 46′ S., Long. 118° 51′* E.), is the entrance to Telok Sera Roentoeh (Runtuh), a small inlet almost entirely filled by a reef which dries. Doro Sera Roentoeh (Runtuh) is a rounded hill, 572 feet ($174^{m}3$) high, rising from the low marshy land on the western side of the inlet.

Telok Langaoe (Langau), at the head of Waworada baai, is almost entirely filled by a mudbank which dries, with marshy shores except for a small rocky part by Doendoe (Dundu) Lakoh, the northern entrance point of the bay, situated about 1¼ miles south-westward of Toro Ladjoh; Doro Lakoh, a rounded hill, 626 feet ($190^{m}8$) high, rises about 2½ cables north-westward of this point. The two small rivers, Sungei Pariah and Sungei Langaoe (Langau), flow out at the head of this bay, and the latter has worn a channel through the mud-bank.

Anchorage.—Directions.—The northern extremity of Nisa Dorah in line with the southern extremity of Nisa Bea, bearing 279°, is a good mark for entering Waworada baai; in clear weather Doro Simposai will be seen right ahead on this bearing, and, when passing Toro Pangkadjarat, should not be opened southward of Nisa Dorah. If anchoring off Keroemboe village vessels can pass on either side of Nisa Bea, taking care to avoid the 2-fathom ($3^{m}7$) reef about 4 cables east-north-eastward of that islet, and anchor in a depth of 8 fathoms ($14^{m}6$), mud, northward of Nisa Bea; there are some rocks awash near the 3-fathom ($5^{m}5$) line off Toro Keroemboe, and when covered they are scarcely visible by discoloration.

Coast.—Toro Bakoe (Baku), 2½ miles eastward of Toro Djampang, can be identified by two high rocks lying on the coastal reef immediately westward of the point; four rocks lie 2 cables southward of Toro Bakoe, outside the coastal reef, and a rock awash lies nearly 1½ cables offshore 7 cables westward of the point. Doro Bakoe (Baku), about 6 cables north-north-eastward of Toro Bakoe, is 1,172 feet ($357^{m}2$) high, and conical in shape when seen from east-south-eastward, but from southward it appears as a table mountain, the south-eastern edge being the highest.

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The coast between Toro Bakoe and Toro Rata, 7 miles eastward, is steep and rocky for the greater part, with an occasional sandy beach. A small rock above water, with a rock which dries, close south-westward of it, lies about 7 cables north-eastward of Toro Bakoe and 1¾ cables offshore; nearly half a mile north-eastward of this rock is a rock awash, just outside the drying coastal reef. Anchorage can be obtained anywhere off this part of the coast, in depths of from 10 to 20 fathoms (18^{m}3 to 36^{m}6), sand, although there is generally some swell.

Between Toro Géloe (Gélu), 5 miles eastward of Toro Bakoe, and Toro Rata is a bay with a sandy beach at the head, where anchorage can be obtained; Toro Rata is a bluff point formed by a spur from Doro Rata, which is 1,359 feet (414^{m}2) high, situated about 2 miles north-north-westward.

Danger.—A rock awash lies nearly in the middle of the entrance of the bay between Toro Géloe and Toro Rata (*Lat. 8° 45′ S., Long. 119° 08′ E.*).

NORTHERN SIDE OF SOEMBAWA.—Aspect.—Vessels passing along the northern side of Soembawa usually steer on the parallel of about 8° S., and at this distance there are few noticeable features except Tambora and the mountains between Sanggar baai and Bima baai; Sangeang, an island (*see* page 230), off Tanjong Naroe (Naru), the north-eastern extremity of Soembawa, can be identified from a great distance.

On the south-eastern slope of Tambora are two prominent conical craters; Tahé, the northern of these, is 2,845 feet (867^{m}1) high, and the southern, about 2½ miles southward of Tahé, is 1,952 feet (595^{m}0) high. The four craters on the north-eastern slope of Tambora, of which the highest is Kadiendinaë, are difficult to identify from seaward.

Between Sanggar baai and Bima baai the most noticeable summits are Sasah, 4,633 feet (1,412^{m}2) high, and Soromandi, 3,819 feet (1,164^{m}0) high, each having double peaks. The mountains between Bima baai and the east coast of Soembawa have no striking features; Maria, 4,849 feet (1,477^{m}9) high, about 11 miles south-south-westward of Tanjong Naroe, is hidden from northward by the intervening mountains.

Tidal streams.—No particulars are available of the tidal streams off the north coast of Soembawa, but strong tidal streams have not been reported, except in the entrances to Saleh baai. It may be expected that the influence of the tidal streams from Straat Alas and Straat Sape will be felt up to Tanjong Sarokaja and Tanjong Ambalawi, 11 miles westward of Tanjong Naroe, respectively.

Coast.—Tanjong Sarokaja, 3 miles eastward of Tanjong Perapat (page 208), is very steep-to, the 100-fathom (182^{m}9) line lying less than half a mile offshore. Telok Dalam, on the western side of Tanjong Sarokaja, affords anchorage to vessels with local knowledge, about 2½ cables offshore at the head of the bay, in a depth of about 20 fathoms (36^{m}6), but it is open to the swell.

Poto Paddoe (Paddu) baai, the entrance to which lies about 2 miles south-eastward of Tanjong Sarokaja, affords good anchorage, free from swell, for small craft. This bay is almost entirely enclosed by high hills and is only about 4 cables long and three-quarters of a cable

Charts 941b, 2759a.

Chart 1696.

wide; the entrance, about a quarter of a cable wide, is not discernible from seaward until a vessel is almost abreast of it. It is advisable to keep close to the north-western point when entering.

Telok Barmang and Telok Lok are about 7½ and 8½ miles, respectively, east-south-eastward of the entrance to Poto Paddoe baai; the western entrance point of Telok Lok is named Tanjong Batoe Poetih (Batu Putih), and this bay affords good anchorage to vessels with local knowledge, in a depth of 12 fathoms ($21^{m}9$).

Planen, 6 miles south-eastward of Tanjong Sarokaja, is 2,284 feet ($696^{m}2$) high, and the most prominent mountain in this district; Ropańg, about 7 miles south-south-eastward of Planen, has a peculiarly sharp summit when seen from northward.

Chart 2785, plan of Sumbawa bay.

Soembawa baai.—Light.—Buoys.—Soembawa (Sumbawa) baai is entered between Tanjong Batoe Koeping (Batu Kuping), situated 5 miles east-south-eastward of Tanjong Batoe Poetih, and Tanjong Limong, 1½ miles north-eastward. There are no dangers outside the coastal reef, which extends 2½ cables north-eastward from Tanjong Batoe Koeping.

The roadstead lies between the parallel of 8°27′ 42″ S. and the coastline.

A light (*Lat. 8° 28′ S., Long. 117° 23′ E.*) is exhibited, at an elevation of 27 feet ($8^{m}2$), from a post, 28 feet ($8^{m}5$) in height, on the south-western shore of the bay, about 4½ cables southward of Tanjong Batoe Koeping.

There is a small pier, which dries alongside, with a flagstaff on the beach, at Po Mandar village, situated at the head of the bay. Soembawa, or Soembawa besar, the headquarters of a Government official and the residence of the Sultan of Soembawa, is situated about 4 miles inland on Sungei Soembawa, which discharges about half a mile north-eastward of Po Mandar; the mouth of this river can be entered by large praus at high water. There is also a large Buginese settlement between Soembawa and the shore of the bay. Soembawa baai is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij; there is telephonic communication between Soembawa and Bima. Vessels usually anchor, in a depth of 16 fathoms ($29^{m}3$), mud, but, the bottom being steep, they lie fairly close to the shore. The bay is open to the prevailing winds in the west monsoon, and during that season small vessels can obtain shelter in the narrow inlet entered about half a mile north-westward of Tanjong Batoe Koeping. Two buoys are laid on the western side of the entrance to this inlet; there is a pier, with a depth of 26 feet ($7^{m}9$) alongside its head, about 1¾ cables within the western entrance point. The inlet is well sheltered from the east monsoon and has depths decreasing from 11 to 3 fathoms ($20^{m}1$ to $5^{m}5$).

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Off-lying islands.—Dangers.—Maddang, 17 miles north-eastward of Tanjong Sarokaja, is low, densely wooded, and fringed by a reef which dries, extending 6 cables from part of the southern side. A bank, with a least depth of 2 fathoms ($3^{m}7$) over it, extends about 1½ miles south-westward from Tanjong Oetara (Utara), the western extremity of the island. Several detached reefs, with depths of from 2½ to 4 fathoms ($4^{m}6$ to $7^{m}3$) over them, lie within one mile of the

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Chart 1696.

north coast, and a sandbank above water lies about 4 cables northward of Tanjong Timor, the eastern extremity of the island. Passing vessels should keep outside the 100-fathom ($182^{m}9$) line. The two villages Mandar and Badjau (Bajau) are situated in the eastern part of the south coast; there is, however, no good anchorage here. On the northern side of the island the depths decrease gradually within the 20-fathom ($36^{m}6$) line and anchorage may be obtained here by vessels with local knowledge, taking care to avoid a 2½-fathom ($4^{m}6$) patch lying 7 cables off the eastern part of this coast. There is also anchorage for vessels with local knowledge, between the sandbank northward of Tanjong Timor and the north-east coast of Maddang, but this anchorage should not be attempted unless the reefs are showing up well.

Mojo, lying south-eastward of Maddang and across the entrance to Saleh baai, is 1,781 feet ($542^{m}9$) high, but there are no noticeable summits. A reef which dries, and a reef, with a depth of 2½ fathoms ($4^{m}6$) over it, lie about half a mile off the west coast, between Tanjong Sarahe Tor (*Lat. 8° 16′ S., Long. 117° 29′ E.*), situated 6 miles northward of Tanjong Tanewang, the south-western extremity of the island, and Tanjong Sadjelek (Sajelek), about 4 miles farther northward; a reef, with a depth of 3¾ fathoms ($6^{m}9$) over it, lies about three-quarters of a mile off the north coast and 4½ miles north-westward of Tanjong Srae, the eastern extremity of the island.

The channel between Maddang and Mojo is clear of dangers and deep.

SALEH BAAI.—Saleh baai, entered by either Straat Saleh or Straat Batahai, extends in a south-easterly direction to within about 6 miles of Tjempi baai, on the south coast of Soembawa. The bay is seldom visited, as there are no trading centres of any importance. The northern part of the south-western side consists mainly of a continuation of the low, undulating plain near Soembawa baai, with occasional rocky portions of coast; farther south-eastward the land rises more rapidly, and the interior is hilly. The north-eastern side of the bay rises gradually to Tambora, and the shore, except at the head of the bay, is very steep-to.

The south-western shore of Saleh baai is indented by many small bays and inlets, off which are numerous islands, all uninhabited, and steep-to rocks covered with vegetation; wild horses are numerous on the larger islands, as is the case throughout Soembawa. There are numerous small villages, along this shore and also at the head of the bay, the principal, from north-west to south-east, being Praja, Koeries (Kuries), Sanggoro, Poengkieng (Pungkieng), Oedjoeng (Ujung), Santong, Djamboe (Jambu), Larak, Wadi, and Kempang.

Straat Saleh.—Anchorage.—Straat Saleh, between Mojo and the north coast of Soembawa, is the southern entrance to Saleh baai. Tanjong Menangis, the southern entrance point of the strait, and about 4 miles north-north-eastward of Tanjong Limong, is the extremity of a high peninsula, which appears as an island from a great distance. The strait is clear of dangers and has steep shores on either side, except for a portion of the southern shore westward of Penjaringan village, situated 3½ miles east-south-eastward of Tanjong Menangis, where the 10-fathom ($18^{m}3$) line lies about half a mile offshore; good

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Chart 1696.

anchorage can be obtained by vessels with local knowledge on this flat about one mile westward of the village, taking care to avoid a 3¼-fathom (5^{m}9) patch lying just within the 10-fathom (18^{m}3) line. It is preferable to hold the northern side of the strait, which is entirely free from danger.

Straat Batahai.—Straat Batahai, between Mojo and the coast of Soembawa eastward, is the northern entrance to Saleh baai; it is also clear of dangers and steep-to on either side, except for a 5½-fathom (10^{m}1) patch lying about 4 cables offshore on the eastern side of the entrance, and about 2 miles north-eastward of Tanjong Srae. Satonda, an island, about 5 miles north-eastward of Tanjong Srae and about 1¼ miles off the Soembawa coast, is very steep-to all round; in the middle of the island is a large salt-water lake, probably an old volcanic crater.

The tidal streams in Straat Saleh and Straat Batahai attain a rate of 2 knots.

South-western and southern sides of Saleh baai.—Coast.—Dangers.—The entrance to Praja baai, close eastward of Tanjong Bara (*Lat. 8° 24′ S., Long. 117° 34′ E.*), situated about 8½ miles eastward of Tanjong Menangis, is about half a mile wide, with depths of from 30 to 34 fathoms (54^{m}9 to 62^{m}2); thence the inlet extends about 5 miles southward, the depths decreasing gradually, and there is good anchorage at the head for vessels with local knowledge. The shores are fringed by a narrow reef, and at the head of the bay, on the eastern side, are two shoals just outside the 5-fathom (9^{m}1) line, with depths of less than one foot (0^{m}3) and 3 feet (0^{m}9) over them, respectively.

Tarata baai.—Dangers.—Tarata baai lies south-eastward of Praja baai, and is entered between Tanjong Kalaning, about 4½ miles south-eastward of Tanjong Bara, and a point 9 miles farther south-eastward. In the entrance are the islands Liang Maja, with its northern extremity 1½ miles eastward of Tanjong Kalaning, and Ngali, with Tanjong Ngali, its northern extremity, 6 miles east-south-eastward of the same point. It affords anchorage off the wide mouth of a river flowing into the south-western corner, in a depth of about 8 fathoms (14^{m}6), mud; Koeries (Kuries), the principal village in the bay, is situated on rising land nearly half a mile up this river, and is plainly visible from the anchorage.

Dangar besar, with a prominent hill, 402 feet (122^{m}5) high, in the northern part, lies about half a mile northward of Liang Maja; a reef extends 4 cables from its south-eastern side and about 2½ cables from its western side. Dangar kechil lies on the southern edge of a reef, 8 cables west-north-westward of Dangar besar. A sandbank lies 6½ cables north-north-westward of Dangar besar.

The main entrance to Tarata baai lies between Liang Maja and Ngali, and is deep, wide, and easy to navigate. A reef, which dries, marked by discoloration, lies nearly 1¼ miles north-eastward off the north-eastern extremity of Liang Maja; the route lies eastward of this reef and thence westward of Kabo, a high, pointed, rocky islet about midway between Ngali and the south-eastern extremity of Liang Maja. A 3-fathom (5^{m}5) patch lying about 4 cables southward of the same point can be passed on either side. The southern extremity of Liang Maja should be passed fairly closely, and course may then be shaped for the anchorage off Koeries village by steering for the mouth

Chart 941b, 2759a.

Chart 1696.

of the river. Care should be taken to avoid the shoals, with depths of about 4 feet ($1^{m}2$) and 1¾ fathoms ($3^{m}2$) over them, lying 6 cables south-westward and south-south-westward, respectively, of the southern extremity of Liang Maja. The portion of Tarata baai southward of the route just described is encumbered with shoals and is not navigable.

Palimpa Asoe kechil, the western entrance channel to Tarata baai, lies between Liang Maja and the coast westward; it is very narrow, especially at the southern end, where the channel leads westward of Batu Poetih, the width here being less than a quarter of a cable, with a least depth of 5 fathoms ($9^{m}1$). A reef, which dries, lies on the western side of the northern entrance to this channel, about midway between Dangar kechil and the coast westward, and a 5-foot ($1^{m}5$) patch, with a deep channel westward of it, lies about the middle of the channel, about 1¾ miles northward of Batu Poetih.

Palimpa Asoe besar, the south-eastern entrance channel to Tarata baai, lies between the south-western side of Ngali and the coast south-westward, and is also very narrow; a least depth of 1¾ fathoms ($3^{m}2$) can be carried through. Palimpa Asoe kechil and Palimpa Asoe besar are used by praus proceeding from Straat Saleh to the southern shore of Saleh baai.

Southern part of Saleh baai.—Coast.—Between Tanjong Dangkalang, the southern extremity of Ngali, and Tanjong Dewa (*Lat. 8° 38′ S., Long. 117° 47′ E.*), 4 miles south-south-eastward, there are two bays, the southern of which is named Telok Taroe (Taru); Sanggoro village is situated on its western shore. Djonga, situated 1¾ miles north-north-westward of Tanjong Dewa and about 3 cables offshore, is a noticeable, rocky islet, and there are several shoals southward of it; there is a clear passage between Djonga and the coast westward. A shoal, with a depth of 2 feet ($0^{m}6$) over it, lies about 2¼ miles east-north-eastward of Tanjong Dewa and between them is a reef which dries.

Between Tanjong Dewa and Tanjong Sarantok, 6½ miles south-eastward, is a large bay encumbered with shoals, reefs, which dry, and rocky islets covered with vegetation; with local knowledge, however, it is practicable to reach Oedjoeng village, situated in the south-western corner of the bay, at the foot of a hillock, 246 feet ($75^{m}0$) high, about 4¾ miles southward of Tanjong Dewa.

Telok Santong is entered between Tanjong Badjak (Bajak), 2 miles east-south-eastward of Tanjong Sarantok, and Tanjong Kasambi, about 1¼ miles farther south-eastward, and affords good anchorage for vessels with local knowledge; Santong village stands in the western corner of the bay. Several shoals, with a least depth of 2¾ fathoms ($5^{m}0$) over them, lie off the entrance, and a ridge, with a depth of 3 fathoms ($5^{m}5$) over its outer end, extends about 1½ miles from the coast eastward of Tanjong Kasambi.

Islands and dangers.—Tengar is a hilly island joined to the south-east coast of Ngali by a reef which dries. Katapang, nearly one mile eastward of Tengar, is low. There is a clear, deep channel between these two islands.

Dompo, half a mile south-eastward of Katapang, is the highest of these islands, and is very prominent, having a saddle-shaped ridge rising to an elevation of 827 feet ($252^{m}1$). There is a clear, deep

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Chart 1696.

channel between the coastal reef extending about 3 cables from the south-eastern side of Katapang and Dompo. Ganteng, a tolerably high islet fringed by a reef, lies about 6½ cables south-south-eastward of Dompo; the channel between Dompo and Ganteng is foul.

Taikabo, about 1¼ miles eastward of Ganteng, is a hilly island; the channel between Ganteng and Taikabo is clear of dangers, except for a rock awash lying about 3 cables north-eastward of Ganteng. A small shoal, with a depth of 1½ fathoms ($2^{m}7$) over it, lies 7 cables south-south-westward of Taikabo.

Lipan, 2¾ miles southward of Taikabo, and Baloso, 1½ miles eastward of Lipan, are tolerably high islets.

Vessels should not attempt to navigate in the area southward and south-westward of the above islands without local knowledge. The portion of Saleh baai eastward of the line joining Taikabo and Baloso is clear of dangers until near the west coast of Rakiet.

Aart van Nes is a shoal, which dries, lying close to the 100-fathom ($182^{m}9$) line, and 3¼ miles north-eastward of Katapang; when covered it is plainly marked by discoloration.

About 2¼ miles eastward of Aart van Nes is a shoal, with a depth of one foot ($0^{m}3$) over it, not marked by discoloration; a steep-to reef, which dries, lies about 1¾ miles farther eastward.

Rakiet, a hilly island, lies close off the middle of the southern shore of Saleh baai, with Tanjong Koentjar (*Lat. 8° 37′ S., Long. 117° 57′ E.*), its north-western extremity, situated about 4¾ miles eastward of Taikabo. Several shoals lie within three-quarters of a mile outside the reef fringing the island; a small, isolated reef, which dries, usually marked by discoloration, lies about 2 miles north-north-eastward of Tanjong Koentjar. Bakau, a flat islet covered with bushes, lies in the middle of the channel between Rakiet and the main coast.

A reef, which dries, lies about 6½ miles north-eastward of the north-eastern extremity of Rakiet, and there are several reefs, which dry, and shoals between this reef and the coast southward.

North-eastern side of Saleh baai.—From Tanjong Brenti, the eastern entrance point of the northern end of Straat Batahai to Tanjong Paranggawaoe (Paranggawau), about 31 miles south-eastward, the shore is very steep-to and there is no anchorage. The only danger in this part of Saleh baai is a small reef, with a depth of one fathom ($1^{m}8$) over it, lying half a mile offshore and about 2 miles west-north-westward of Tanjong Ntjanga (Nchanga), situated 7½ miles west-north-westward of Tanjong Paranggawaoe.

Tanjong Kesi is situated about 7 miles south-eastward of Tanjong Paranggawaoe, and there is fairly good anchorage in the bay close eastward of the latter point, in a depth of 15 fathoms ($27^{m}4$). Sapoedoe (Sapudu), 1½ miles southward of Tanjong Kesi, is a rock covered with vegetation, and fringed by a reef, which dries, extending about 1½ cables from its northern and southern sides, with several rocks above water on it.

Telok Kempang is entered between Tanjong Kesi and a point about 3 miles east-south-eastward. Roemah (Rumah), 836 feet ($254^{m}8$) high, on the eastern side of this bay, is very prominent, and is the southern extremity of a ridge which, owing to its even crest, appears like the roof of a house.

Head of Saleh baai.—**Dangers.**—The head of Saleh baai between

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Tanjong Taroedjoeng (Tarujung), situated southward of Rakiet, and Tanjong Pekat, 11½ miles east-north-eastward, is indented by several small bays, none of which is of any importance. Telok Bangko Loea (Lua) is entered between Tanjong Pekat and Panihi, an islet, one mile east-north-eastward; Panihi is the westernmost of a group of islets extending about 2 miles eastward, named Besar, Wakokos, Kawangko, and Balere. Telok Bangko Loea affords very good anchorage for vessels with local knowledge; when entering, vessels should pass fairly close to Tanjong Pekat, so as to avoid a small shoal, with a depth of 3 feet ($0^{m}9$) over it, lying one mile northward of that point.

Telok Larak and Telok Napa are two small bays between the easternmost of the above islets and a point 2½ miles eastward. The wooded islet Madja (Maja) lies about 3 cables northward of the western entrance point of Telok Larak, and Napa, a large rock above water, lies on the reef extending from the eastern entrance point of Telok Napa; a rock above water lies about 2 cables north-westward of Napa. A shoal, with a depth of 1½ fathoms ($2^{m}7$) over it, lies about 3 cables northward of the point dividing the two bays.

COAST.—The coast eastward of Saleh baai, between Tanjong Brenti and Tanjong Pakidjongan (Pakijongan) (*Lat. 8° 05′ S., Long. 117° 56′ E.*), 12 miles east-north-eastward, is flat over a width of about one mile and then rises to the slopes of Tambora. Tanjong Pakidjongan is a steep point with a hill, 640 feet ($195^{m}1$) high, one mile southward of it; from eastward, when Satonda (page 225) is in line with Tanjong Pakidjongan, it is possible that this hill may be mistaken for the island from a great distance.

Between Tanjong Pakidjongan and the entrance to Bima baai, about 46 miles east-south-eastward, the coast is very steep-to, and the depths are too great for anchoring except in the bays described hereafter at the head of the wide bight between Tanjong Katoepa (Katupa), situated about 14 miles eastward of Tanjong Pakidjongan, and Tanjong Djoeli (Juli), 20 miles farther east-south-eastward. A narrow strip of relatively low land lies within the rocky coast, and then the land rises fairly steeply to the mountains of the interior.

Local magnetic anomaly.—Local magnetic anomaly has been reported off the north coast of Soembawa, in the vicinity of Tambora; caution should be exercised, therefore, when navigating along this part of the coast.

Chart 2785, plan of Sanggar or Dompo bay.

Telok Moti Toi.—Dangers.—Telok Moti Toi is situated close westward of Tanjong Pioen (Piun), a high, rocky point about 14 miles south-eastward of Tanjong Katoepa; it is entered by passing either eastward or westward of a shoal ridge extending in a north-westerly and south-easterly direction across the entrance; this ridge has a least depth of 5 feet ($1^{m}5$) in the north-western part and 1½ fathoms ($2^{m}7$) near the middle, and is easily approached by sounding. There is good anchorage inside the ridge, in depths of from 14 to 16 fathoms ($25^{m}6$ to $29^{m}3$), sand and mud.

Baai van Sanggar.—Dangers.—Baai van Sanggar or Dompo is entered between Tanjong Pioen and Tanjong Propa, 7 miles east-north-eastward. Radeh is an islet lying on the reef, which dries, extending 2¼ cables from Tanjong Kenieke, situated about 1⅜ miles southward

Charts 941b, 2759a.

Chart 2785, plan of Sanggar or Dompo bay.

of Tanjong Pioen; a reef, which dries, lies 3 cables northward of Radeh, and a 2½-fathom ($4^{m}6$) patch lies about 4 cables eastward of the islet. Between this patch and the anchorage there is foul ground. Sanggar village, where the Rajah resides, stands about one mile south-eastward of Tanjong Kenieke.

The best anchorage is in the eastern part of the bight between Tanjong Kenieke, and Tanjong Matompo, 2½ miles eastward, off the mouth of Sungei Kamboe (Kambu), in a depth of about 16 fathoms ($29^{m}3$), mud.

Telok Kilo, in the eastern part of Sanggar baai, affords good anchorage, in a depth of 15 fathoms ($27^{m}4$), eastward of a 2¾-fathom ($5^{m}0$) patch lying nearly in the middle of the entrance and 1½ miles south-south-westward of Tanjong Propa.

Chart 2785, plan of Bima bay.

Bima baai.—Light.—Beacon.—Bima baai is entered between Tanjong Lambeh, about 12 miles east-south-eastward of Tanjong Djoeli, and Tanjong Batoe Poetih (Batu Putih) (*Lat. 8° 21′ S., Long. 118° 44′ E.*), 5 miles south-eastward; it extends in a southerly direction for about 13 miles, between high hilly land, and affords secure and landlocked anchorage over practically the whole of the inner part. In the narrowest part of the entrance the width is about 3 cables and the channel winds somewhat, but farther southward it widens out to about 2 miles, nearly to the head, the depths in the fairway decreasing gradually from about 25 fathoms ($45^{m}7$) to 6 fathoms ($11^{m}0$). There is a native fort on either side of the narrow part of the entrance.

Kambing, an island, in the inner part of the bay, rises steeply from the sea on the southern side; in the northern part is a flat hill, used as a burial ground for native chiefs and regarded as sacred. A 4¼-fathom ($7^{m}8$) patch lies 2 miles southward of Kambing and about 8 cables off the western shore; northward of this patch the bay and the entrance are clear of dangers outside the narrow coastal reef.

The town of Bima is a collection of about 26 villages built on a plain on the eastern side of the bay, opposite Kambing, through which Sungei Romo flows; the Sultan of Bima resides here, but the Dutch official lives at Raba, about 2½ miles inland, on the main road connecting Bima with Badjo, on the east coast of Soembawa.

A light is exhibited, at an elevation of 13 feet ($4^{m}0$), on the head of the pier at Bima.

A white beacon, surmounted by a white triangle, stands on the eastern side of the channel about 2½ miles north-north-westward of the light-structure on the pier.

Reede Bima is bounded by the eastern side of Kambing, and by lines drawn from the northern and south-eastern extremities of that island to Tanjong Tampa and Tanjong Lawata, on the eastern side of Bima baai, respectively.

Anchorage can be obtained almost anywhere in the inner part of the bay, in depths of from 6 to 18 fathoms ($11^{m}9$ to $32^{m}9$), sand and mud; off Bima, vessels usually anchor between Kambing and the mouth of Sungei Romo, in a depth of 9 or 10 fathoms ($16^{m}5$ or $18^{m}3$). During the South-east monsoon very strong southerly winds, accompanied by heavy squalls, sometimes blow continuously for many days; the land and sea breezes are, however, usually regular in both monsoons, the former blowing directly out through the entrance, and the

Charts 1696, 941b, 2759a.

Chart 2785, plan of Bima bay.

latter directly in. No tidal streams of any importance have been reported.

Harbour facilities.—A stone pier, with a **T**-head, outside which there is a landing pier, having a depth of 16 feet (4^{m}9) alongside, extends about 1½ cables from the northern entrance point of Sungei Romo. There is also a stone pier, with a depth of 10 feet (3^{m}0) alongside, on the eastern side of Kambing. There is a stone pier, with depths of from 11 to 23 feet (3^{m}4 to 7^{m}0) alongside at Tanjong Lawata.

A small stock of coal, for the use of Government vessels, is kept on Kambing. Fresh provisions and water may be obtained.

Vessels of the Koninklijke Paketvaart Maatschappij call regularly at Bima (*Lat. 8° 27′ S., Long. 118° 44′ E.*).

Chart 1696.

Coast.—The coast between Tanjong Batoe Poetih and Tanjong Naroe (Naru) (*see* below), is low and flat almost throughout; along the beach is a line of trees of equal height, and there are no prominent points. The only change of aspect is in the vicinity of Telok Wera, 5 miles westward of Tanjong Naroe, where a ridge of hills rises abruptly from the entrance points of the bay. The wide valley, which forms a means of communication with the interior, is visible far out at sea and is a good indication of the position of the bay when approaching from northward. Two rocks lie on the drying reef extending from the western entrance point of the bay, the western and larger being about 30 feet (9^{m}1) in height; the eastern entrance point of the bay is also rocky, but there is a sandy beach between the two points. Sungei Wera, merely a stream, flows out at the head of the bay, and there was a large bamboo shed in 1947 on the eastern side of the mouth; there is anchorage for vessels with local knowledge either eastward or westward of the mouth, in a depth of about 10 fathoms (18^{m}3), but that westward is preferable, as the 5- and 10-fathom (9^{m}1 and 18^{m}3) lines are farther apart from each other here. The village is not visible from the bay, but a row of coconut trees behind it indicates its position.

The rocky coast continues for about one mile eastward of Telok Wera, and then becomes low again, with a sandy beach. Under favourable conditions anchorage may be obtained, by vessels with local knowledge, in a depth of 8 fathoms (14^{m}6), eastward of a low point about midway between Telok Wera and Tanjong Naroe.

Tanjong Naroe is low, flat, and densely covered with trees and shrubs. A reef, which dries, extends about 3 cables eastward from the point. Even in calm weather a considerable sea is raised by the strong tide-rips between the edge of this drying reef and the 10-fathom (18^{m}3) line.

Sangeang.—Sangeang, which is separated from Tanjong Naroe by a channel about 3½ miles wide, is a volcanic island rising in two peaks, the northern pointed and 6,330 feet (1,929^{m}3) high, and the southern blunt. The island is fringed by a narrow reef, which dries, and is very steep-to. Temporary anchorage for small vessels with local knowledge may be obtained off Bontoh village, on the west coast, and in Laboe Djoroh (Labu Joroh), an inlet about 1½ miles northward of Bontoh. Sangeang is sparsely populated, Bontoh being the only village; kapok is grown on the western side of the island.

The channel between Sangeang and Tanjong Naroe, known locally

Charts 941b, 2759a.

Chart 1696.

as Straat Sangeang, is deep and clear of dangers; there appear to be no strong tidal streams through it.

EASTERN SIDE OF SOEMBAWA.—Coast.—Anchorages.—Anchorage may be obtained by vessels with local knowledge in the slight indentation between Tanjong Naroe and Toro Tingeh, about 5 miles southward, but the ground swell and current make it uneasy; a shoal, with a least depth of 3¼ fathoms ($5^{m}9$) over it, lies 7 cables offshore and about 1¾ miles north-north-westward of Toro Tingeh, which is a prominent, rocky point about 100 feet ($30^{m}5$) high.

Toro Lando lies 3 miles south-eastward of Toro Tingeh. Batu Kapal, about one mile north-westward of Toro Lando, is a rocky islet lying on a steep-to reef which partly dries, 3 cables offshore; there is very good anchorage for vessels with local knowledge in the small bay southward of Batu Kapal. There is also good anchorage, in depths of from 10 to 20 fathoms ($18^{m}3$ to $36^{m}6$), in Labuan Tjeri (Cheri), on the southern side of Toro Lando, and in Labuan Kowo, on the northern side of Tanjong Wamba, a hilly point about 4½ miles southward of Toro Lando; a reef, with a depth of 3 feet ($0^{m}9$) over it, and a wreck partly above water on its north-western side, lies about 6 cables offshore and one mile northward of Tanjong Wamba (*Lat. 8° 31′ S., Long 119° 03′ E.*)

Between Tanjong Naroe and Toro Tingeh the mountains lie some distance from the coast, but thence to Tanjong Wamba they lie close inland. Maria, 7¾ miles westward of Tanjong Wamba, is the highest mountain in this part, and has a blunt summit. *See* page 222.

Chart 895, plan of Tanjong Wamba to Toro Rano.

The low islet Kamara, lying on the reef extending 1½ cables from Tanjong Wamba, is not very noticeable. Southward of Tanjong Wamba the land is mostly low and flat; Toro Naga Noeri (Nuri), 3 miles south-westward of Tanjong Wamba, is the termination of a ridge running through this plain. The bay between these two points is of little importance and there are several shoals in it; a 3¾-fathom ($6^{m}9$) patch lies about 1¼ cables eastward of Toro Naga Noeri.

Nisa Sanai, about one mile south-eastward of Toro Naga Noeri, is an uninhabited, steep island, 466 feet ($142^{m}0$) high, easily identified from Straat Sape owing to the low land behind it. A reef, which dries, extends 2½ cables from its north-western side, with two islets, and three large rocks on it.

Sape baai.—Sape (Sapeh) baai, entered from northward between Toro Naga Noeri and Nisa Sanai, is sheltered from eastward by that island and from southward by the reef, on which are several islets, connecting that island to the mainland. The northern entrance is clear, except for the previously mentioned 3¾-fathom ($6^{m}9$) patch off Toro Naga Noeri, and has a depth of 17 fathoms ($31^{m}1$) in the fairway, Badjo (Bajo), the highest and largest of the islets in the southern entrance to the bay, is inhabited; Nisa Tosso, 3½ cables north-westward of Badjo, is 44 feet ($13^{m}4$) high; a detached reef, with a depth of 2 fathoms ($3^{m}7$) over it, lies about midway between Nisa Tosso and Nisa Sanai, otherwise there are no dangers in Sape baai; Pakai Dekkoh and Pontai Kabang, south-westward of Badjo, are 64 feet ($19^{m}5$) high and covered with reeds. The passages between these islets are used by praus.

Charts 941b, 2759a.

Chart 895, plan of Tanjong Wamba to Toro Rano.

Badjo village is situated on the western shore of the bay, between the mouths of Sungei Ringit and Sungei Soroh ; a stone pier, 3¼ cables in length, with a depth of 16 feet (4^{m}9) alongside its head, extends from the shore close northward of the mouth of the latter stream. Sape (Sapeh) and other villages are situated farther inland.

Sape baai affords safe anchorage even for large vessels, which anchor northward of Nisa Tosso ; small vessels can anchor south-westward of this islet, off the head of the pier. Provisions can be procured from the villages. The bay is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Coast.—Dangers.—Anchorages.—Immediately southward of the reef joining Nisa Sanai to the main coast is a small, unnamed bay or basin which affords good anchorage. A bank, which dries, extends about 4 cables from the south-western shore of the bay, and Radeh, an islet (*Lat. 8° 36′ S., Long. 119° 03′ E.*), 64 feet (19^{m}5) high, lies on this bank near the southern entrance point of the bay ; a rock, 44 feet (13^{m}4) high, lies on the bank about 3 cables northward of Radeh. To enter the bay, a vessel should steer 267° to pass close along Tanjong Nonno, the southern extremity of Nisa Sanai, as there are several shoals on the southern side of the entrance, the position of which can best be seen on the chart.

Between Radeh and Toro Gadoeh (Gaduh), about 4¼ miles eastward, there is a bay with excellent anchorage between the 10- and 20-fathom (18^{m}3 and 36^{m}6) lines. On the eastern side of this bay is an inlet named Loh Latoh, but it is too much encumbered with reefs to be recommended as an anchorage, and the shore is fringed by a wide bank. Grihi, a bare white rock, 44 feet (13^{m}4) high, lies on the western side of the bay, 4¼ cables offshore and 5½ cables south-south-eastward of Radeh.

At the entrance to the bay, nearly midway between Radeh and Toro Gadoeh, is a reef with a least depth of 5½ fathoms (10^{m}1) over it. A ridge, with a least depth of 1½ fathoms (2^{m}7) over it, extends 4 cables north-eastward from Toro Gadoeh. A sandbank, which dries, marked by surf and discoloration, lies off the entrance to Loh Latoh and about 1½ miles south-westward of Toro Gadoeh.

Close to the shore at the head of the bay is a long chain of mountains lying in a westerly and easterly direction ; at the western end is Doro Papa, and at the eastern end are two very prominent peaks, the eastern of which is Lamboe (Lambu), 3,167 feet (965^{m}3) high. The peninsula forming the eastern side of the bay is hilly, and has a barren appearance in the dry season.

The coast between Toro Gadoeh and Toro Mabalang, about 4¼ miles north-eastward, is indented by several inlets, mostly encumbered by banks, which dry. Nisa Dokoh lies in the entrance to Labuan Dokoh, 1¼ miles eastward of Toro Gadoeh, and the only suitable anchorage off this part of the coast is north-eastward of this islet.

Sentodo, an islet, 192 feet (58^{m}5) high, lies about three-quarters of a mile north-eastward of Toro Mabalang and is separated from it by a deep channel ; it rises sheer from the sea, and its upper part is covered with reeds and low trees on its southern side. Close westward of Sentodo is a lower but equally steep islet, hollowed out to such an extent by the action of the sea that it resembles a viaduct ; two rocks, 25 feet (7^{m}6) high, lie about 2¾ cables eastward of Sentodo. At

Charts 1696, 941b, 2759a.

times there are heavy tide-rips in the channel between these islets and the Soembawa coast, extending far into Straat Sape.

For off-lying dangers north-eastward of Toro Mabalang, *see* page 256.

At Toro Mabalang the coast turns abruptly southward and trending for about 10 miles to Toro Rano, is indented by several bays, all more or less suitable for anchorage according to the direction of the wind and the state of the sea; this coast is uninhabited. Labuan Djati (Jati), the northernmost bay, is the most sheltered, as the island Mata Gateh or Kamara lies across its entrance; this island is 241 feet (73^m5) high, and rises steeply from the sea nearly all round; it is fringed by a reef in places, but there is a sandy beach in the bays on the eastern and western sides. There is a small, rocky islet about 1½ cables north-eastward of Toro Djati (Jati), the northern entrance point of Labuan Djati; Toro Wadoe (Wadu) Dali, the southern entrance point of the bay, is steep. The best anchorage, free from tide-rips, is in the southern part of the bay, in depths of from 10 to 20 fathoms (18^m3 to 36^m6). If entering by the southern entrance it is preferable to pass westward of a 1½-fathom (2^m7) shoal lying about half a mile southward of Mata Gateh.

Tanjong Botoe (Botu), (*Lat. 8° 39′ S., Long. 119° 11′ E.*), about 3¾ miles southward of Toro Wadoe Dali, is the southern entrance point of Labuan Botoe (Botu), which affords anchorage for large vessels; landing can be easily effected in the creeks on the northern side of the bay. A reef, with depths of less than 5 fathoms (9^m1) over it, extends about one mile east-north-eastward from Tanjong Botoe, and frequently breaks heavily; a low, rocky islet about 3 cables south-eastward of the northern entrance point of the bay in line with a similar islet lying 2½ cables offshore and about 6½ cables northward, bearing 359°, leads close eastward of this reef.

A small islet lies on the reef extending from the unnamed point 2½ miles southward of Tanjong Botoe. Small vessels may obtain good anchorage in the small bay northward of this point. Southward of Tanjong Rata, half a mile farther southward, the coast rises steeply from the sea, and there is practically no coastal reef. A rock, with a depth of 2¾ fathoms (5^m0) over it, lies about 2 cables off the middle of the northern shore of the bay between Tanjong Rata and Toro Rano.

Toro Rano is a steep point which may be identified by a conical hill, 728 feet (221^m9) high, just inside the point. An arched rock, 25 feet (7^m6) high, with two rocks above water close to it, lies close eastward of the point; two rocks, which dry, usually marked by surf, lie close south-eastward of the arched rock.

Kelapa.—Lights.—Kelapa, an island, situated with its southern extremity about 3½ miles north-eastward of Toro Rano, has a plateau in its northern part, 418 feet (127^m4) high and entirely covered with reeds; only the lower parts of the island are wooded. The coast is indented with bays on all sides, some of which afford anchorage. A reef, which dries, extends about 8 cables from the eastern side, and there are a number of islets and very slender pinnacle rocks, from 25 to 45 feet (7^m6 to 13^m7) high, on it. *See* view facing page 255.

Leading lights are shown from the summit of Kelapa. The front light is exhibited, at an elevation of 441 feet (134^m4), from a white, framework tower, 13 feet (4^m0) in height; the rear light is exhibited, *Chart 895, plan of Tanjong Wamba to Toro Rano.*

at an elevation of 507 feet (154^{m}5), from a similar tower, 49 feet (14^{m}9) in height, situated about 1¼ cables southward of the front light.

The above lights in line, bearing 172°, lead through the channel between Mata Gateh and Barsoe Panda (page 256).

Iloes (Ilus), a rocky islet, 123 feet (37^{m}5) high, lies about 1¼ miles west-south-westward of the southern extremity of Kelapa. A low islet, almost bare, lies close north-north-eastward of Iloes, with a channel having a least depth of 3¼ fathoms (5^{m}9) between. A steep-to ridge, with a least depth of 5½ fathoms (10^{m}1) over it, lies between Iloes and the southern end of Kelapa; as there are heavy rollers and tide-rips over this ridge, vessels using the channel between Kelapa and the Soembawa coast should pass westward of Iloes.

A rocky islet, 93 feet (28^{m}3) high, with a rock above water on its eastern side, lies 6½ cables south-south-westward of Iloes (*Lat. 8° 42′ S., Long. 119° 12′ E.*).

Chart 1696.

ISLANDS NORTHWARD OF SOEMBAWA.—Northward of Soembawa, between the parallels 6° 30′ S., and 7° 50′ S., are two groups of islands named, respectively, Paternoster eilanden and Postiljon (Postillon) eilanden; the latter are divided into two distinct groups, lying on separate plateaus north-east and south-west from each other. Southward of the western end of the Paternoster group are the Zandbuis and Maria Reigersbergen banken, both banks lying on the same plateau. Separating the four main plateaus, on which all these islands and reefs lie, are wide channels with depths of over 100 fathoms (182^{m}9), which can be safely navigated by day. The islands are seldom visited, except by Chinese junks to collect tripang, and Makasser praus for copra.

The larger islands of the groups have a peculiar formation, in some very pronounced, in others with the growth of the reef only in the early stages, viz: the seaward side consists of a low ridge, a quarter to half a cable wide, thickly covered with vegetation consisting mainly of mangroves and coconut trees; the main island lies behind this ridge, and the intervening reef either dries or is submerged.

Currents and tidal streams.—Over the plateaus on which Paternoster and Postiljon eilanden lie, and in the channels between the plateaus, the tidal streams only appear to be appreciable in so far that they strengthen the monsoon currents when both are running in the same direction, and weaken the monsoon currents when opposed to it; a rate of from one to 2 knots over the plateaus is not exceptional.

The combined stream is usually strongest along the eastern and south-eastern edges of the plateaus, in some places attaining a rate of from 2½ to 3 knots for about an hour, with whirlpools and heavy tide-rips; although the same peculiarity is sometimes observed along the western and north-western edges of the plateaus, it does not occur in so marked a degree. It is always advisable for passing vessels to give the edges of the plateaus a wide berth.

Zandbuis and Maria Reigersbergen banken.—**Light.**—These two banks, lying with their southern edge about 31 miles northward of Tanjong Perapat (page 208), form one large atoll, very steep-to on its outer side. On the Zandbuis or Sadapoer banken are three banks, which dry, with several islets partly covered with vegetation on them;

Charts 941b, 2759a.

Chart 1696.

from the eastern islet a ridge of coral, with a least depth of 1¾ fathoms ($3^{m}2$) over it, runs along the eastern edge of the plateau.

Maria Reigersbergen or Sakoentji banken lie on the southern edge of the atoll and consist of a steep-to coral plateau with a portion, of coral sand, always above water; immediately northward of these banks is the deepest part of the atoll, with depths of over 100 fathoms ($182^{m}9$).

The western side of the atoll may be approached cautiously and anchorage obtained, in depths of from 16 to 30 fathoms ($29^{m}3$ to $54^{m}9$), sand and coral.

A light is exhibited, at an elevation of 41 feet ($12^{m}5$), from a black iron beacon, 33 feet ($10^{m}1$) in height, on the eastern part of Maria Reigersbergen banken (*Lat. 7° 51′ S., Long. 117° 12′ E.*).

Paternoster eilanden.—Only a few of the islands of the Paternoster or Pulau Tengah group are inhabited, chiefly by Buginese, who live by fishing and the cultivation of coconut trees; the native chief resides in a village on the south-west coast of Sailoes (Sailus) besar, in the western part of the group. The plateau on which these islands lie rises very steeply from the sea on all sides, and the edge of the 100-fathom ($182^{m}0$) line is generally clearly defined. Except at the eastern end, where there are numerous reefs, the plateau can be easily navigated; the passages between the islands are mostly deep and clear of dangers, and the reefs are clearly marked by discoloration, patches with depths of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$) being sometimes so plain that they give the impression of much less water.

Kapoposang Bali, the western island of the group, is situated at the south-eastern end of a separate plateau; it is wooded and a tall tree in the middle of the island is prominent except from northward; the passage between this plateau and the main plateau is very deep and clear of dangers, but, as it is comparatively narrow, it cannot be recommended on account of the strong tidal streams.

Satengar, the largest island of the group, lies 5½ miles eastward of Kapoposang Bali and is inhabited. Sailoes besar, 5½ miles eastward of Satengar, has wells of fresh water; Sailoes (Sailus) kechil lies about 2 miles southward of Sailoes besar. Marabatoeang (Marabatuang), about 2¼ miles north-eastward of Sailoes besar, is exceptional in its formation, as the out-lying ridge lies on the eastern side of the island instead of the seaward side. Karang Satoenggoel (Satunggul), at the eastern end of the plateau, consists of several small islets on a reef, which dries, as the latter is not yet sufficiently high for the full formation of an island.

Anchorage.—Directions.—Anchorage can be obtained by a vessel with local knowledge either eastward or south-westward of Sailoes besar, outside the 10-fathom ($18^{m}3$) line. The easiest way to reach these anchorages is from northward, passing between Satengar and Sailoes besar if anchoring south-westward of the latter island, and between Sailoes besar and Marabatoeang if proceeding to the eastern anchorage.

The anchorage south-westward of Sailoes besar can be reached from southward by steering for the western extremity of that island, bearing between 005° and 015°; this course leads, in a least depth of 9 fathoms ($16^{m}5$), over a sandy ridge between Sailoes kechil and a reef, which dries, 5 miles westward. The anchorage eastward of Sailoes besar

Charts 2637, 941b, 2759a.

Chart 1696.

can be reached from eastward by steering for the southern extremity of that island, bearing 270°.

Outlying bank.—An extensive bank, rising from great depths, lies about 22 miles eastward of Karang Satoenggoel. The least depth which is on the north-western edge, is 5½ fathoms (10^{m}1); it is marked by heavy tide-rips, and the bottom, of sand and coral, is visible in many places.

South-western group of Postiljon eilanden.—Nearly all the islands of the Postiljon or Pulau Sabalana group are situated on the northern part of the steep-to plateau containing them; most of them are inhabited and devoted to the cultivation of coconut trees. Sapoeka (Sapuka) besar, in the middle of the northern side of the plateau, is the most important island and a native chief resides here; Sapoeka (Sapuka) kechil (*Lat. 7° 07′ S., Long. 118° 10′ E.*) lies on the northern part of an extensive reef, which dries, southward of Sapoeka besar. Between Sapoeka besar and Pelokang, at the eastern end of the plateau, there is a chain of reefs, with the two islets Sambardjaga (Sambarjaga) and Sambargigitang, on which are some noticeable trees; there is also a noticeable tree on the islet close east-north-eastward of Pelokang. The western side of the plateau, between Kambang Lamari and Tokoh Batoe (Batu), is clear of dangers. There is a noticeable tree on Lamoeroeang (Lamuruang), the southern island of this group.

Anchorage.—Directions.—A vessel making for Sapoeka besar should pass southward of Sambardjaga, steering for Sapoeka kechil, bearing 258°, and for the western extremity of Sapoeka besar when it bears 305°, anchoring southward of the edge of its fringing reef, in depths of from 20 to 30 fathoms (36^{m}6 to 54^{m}9). Bound westward from this anchorage the passage between the coastal reefs of the two Sapoeka eilanden may be taken by a vessel with local knowledge.

North-eastern group of Postiljon eilanden.—Light.—All the islands of this group lie close to the north-eastern and south-eastern edges of an extensive, steep-to plateau, rising from great depths; as in the south-western group most of the islands are inhabited and used for the cultivation of coconut trees. The native chief of the entire group resides on Balobaloang besar, near the northern extremity of the plateau, and an overseer of the coconut plantations lives on Sabalana, near the eastern end of the plateau. During the favourable time of the year numerous large and small praus are engaged in fishing around the shoals on the plateau.

Longko Itang and Bangko Bangkoang lie off the north-western extremity of the plateau of the north-eastern group of the Postiljon eilanden, and are separated from it by a very deep channel; there are also depths of over 100 fathoms (182^{m}9) between these two islands. A shoal, with a depth of 5½ fathoms (10^{m}1) over it, lies about 5 miles north-eastward of Bangko Bangkoang, and a shoal, with a depth of 5 fathoms (9^{m}1) over it, lies about 9 miles eastward of the same island.

A light is exhibited, at an elevation of 63 feet (19^{m}2), from a white iron framework structure, 49 feet (14^{m}9) in height, on the north-eastern extremity of Banawaja, the easternmost island of the north-eastern group of Postiljon eilanden.

Anchorage.—Directions.—Sabalana, Santigiang, Pamolikang, Banawaja, and Lilikang lie on a large reef, which dries, at the eastern end of the group; from this reef two arms, with depths of less than

Charts 2637, 941b, 2759a.

Chart 1696.

3 fathoms ($5^{m}5$) over them, extend westward and enclose a basin with depths of from 4 to 9 fathoms ($7^{m}3$ to $16^{m}5$), sand, affording safe anchorage at all times to vessels with local knowledge. Soeroeaboe (Suruabu) lies near the outer end of the southern arm, and Sanana besar and Sanana kechil lie close north-westward of the northern arm; Meong lies on the western side of the basin, and Matalaäng is about 1¼ miles westward of Meong.

The basin is entered from westward, passing either northward or southward of the drying reef fringing Meong (*Lat. 6° 51′ S., Long. 119° 00′ E.*). During the west monsoon it is advisable to take the passage between Matalaäng and Meong, passing thus southward of Meong and over a stony ridge, with a least depth of 4 fathoms ($7^{m}3$) over it; in the east monsoon vessels can pass northward of Meong, where there is a least depth of 3¼ fathoms ($5^{m}9$) over the ridge.

Charts 2637, 941b, 2759a.

CHAPTER IX

SOEMBA, KOMODO, AND FLORES EILANDEN, WITH ADJACENT ISLANDS AND PASSAGES

Chart 941b.

SOEMBA.—Soemba (Sumba), an island, lying south-eastward of Soembawa, is mostly low and flat along the coast, except on the southern side, where it is high and steep; the mountains, which nowhere attain an important elevation, lie some distance inland. The middle and eastern parts of the island are almost entirely occupied by bare tableland, intersected by rocky ravines; the western part is more wooded and hilly. There are no useful landmarks when navigating at some distance from the northern side of the island except the projecting land, 1,455 feet (443^{m}5) high, which terminates in Tanjong Sasar, the northern extremity of the island. The most noticeable feature on the southern side is Pengadoe (Pengadu) Sasa gebergte, which is 2,423 feet (738^{m}3) high at its northern end, situated 6½ miles northward of the southern extremity of the island, and Massoe (Massu) gebergte, 4,014 feet (1,223^{m}5) high, about 13 miles west-north-westward of the northern extremity of Pengadoe Sasa gebergte.

Except off the south-eastern end of the island there are no off-lying dangers, and the coast is generally steep-to close to the coastal reef, which is mostly narrow.

Several rivers flow into the sea, but they are merely the accumulation of mountain streams, and only a few can be entered at high water by praus. In the middle part of Soemba there are a few very small villages, at great distances apart and all lying in the valleys of the streams; the western part of the island is fertile and is, therefore, more populated, with large villages situated in the midst of rice fields. Agriculture is the main industry, and fishing praus are scarcely ever seen under the coasts; there is a large export of horses.

Climate and weather.—The climate is very healthy and there is little sickness amongst the inhabitants. November is the hottest month, and the temperature then frequently reaches 95°; from the middle of June to August the nights are comparatively cold.

In February, during the west monsoon, the rivers become very swollen; from June to October it seldom rains near Waingapoe (page 243), and the land in this district becomes very dry and withered. *See* also page 17.

NORTHERN SIDE OF SOEMBA.—Aspect.—When seen from any distance the rounded points of this generally low coast are seldom

Chart 2759a.

Chart 941b.

noticeable when abreast them. Between Tanjong Karosso, the western extremity of Soemba, and Tanjong Waiwala, about 19 miles north-eastward, the interior presents no noticeable features, and appears as one horizontal ridge, sloping down westward; a dark-coloured wood named Atedalo, situated on a somewhat higher ridge of hills 2½ miles eastward of Tanjong Karosso, is a useful landmark when fairly close to the coast, and has a square tree, higher than the others, on its northern side.

Zadelberg, 1,668 feet ($508^{m}4$) high, 6½ miles southward of Tanjong Waiwala, can be identified when off the coast between this point and Tanjong Nanga Amba, 6½ miles eastward; its north-western summit is rounded and thickly wooded, the south-eastern summit is somewhat conical. The villages Pondokaboemboe (Pondokabumbu) and Totoka, situated on high ground about 5 and 6½ miles, respectively, southward of Tanjong Nanga Amba, are visible from seaward; the former stands on both sides of a ravine half way up the mountains, at an elevation of 704 feet ($214^{m}6$), and the latter is on the crest of a mountain, 1,422 feet ($433^{m}4$) high. Wajéwa, 6 miles south-south-eastward of Totoka village and 2,406 feet ($733^{m}4$) high, is very noticeable when near Tanjong Batoembaba (Batumbaba), a rocky point, about 10 miles eastward of Tanjong Nanga Amba, and shows as a small cone above the other mountains; Talarioe (Talariu), about 4 miles eastward of Wajéwa, is 2,718 feet ($828^{m}5$) high, and the highest peak of a ridge sloping down very gradually eastward and westward.

About 5 miles south-eastward of Tanjong Batoembaba, and southward of Memboro baai, there is a fairly noticeable round-topped tree at an elevation of about 800 feet ($243^{m}8$), with a tall, straight tree close south-eastward of it; three clumps of trees stand about 1½ miles farther south-eastward, at an elevation of 1,200 feet ($365^{m}8$). About 5 miles south-south-eastward of Tanjong Wanda, situated about 9½ miles eastward of Tanjong Batoembaba, is a mountain with a wooded summit, but it is only noticeable from close off the coast near Palmedo, about 8 miles east-south-eastward of Tanjong Wanda, and the same applies to the villages Wirindolo and Léna, standing at elevations of 300 feet ($91^{m}4$) and 435 feet ($132^{m}6$), about 1½ and 2 miles, respectively, southward of Palmedo.

Léna (*Lat. 9° 27′ S., Long. 119° 47′ E.*), 1,297 feet ($395^{m}3$) high, and wooded on its summit, lies 4 miles south-south-eastward of Palmedo (page 241), and is noticeable from off the coast between Tanjong Wanda and Tanjong Sasar. Bolobokat village stands on the summit of a mountain, 2,059 feet ($627^{m}6$) high, 5 miles south-westward of Léna; about 1¼ miles north-westward of Bolobokat is a summit 2,032 feet ($619^{m}4$) high, with a few trees on it.

Coast.—Light.—The coast for about 2 miles northward of Tanjong Karosso is bordered by a sandy beach and a reef extends from 2 to 3 cables offshore, but farther north-eastward it becomes steep and rocky, with occasional sandy beaches, to beyond Tanjong Waiwala. Waikasaka village is situated nearly 4 miles north-north-eastward of Tanjong Karosso, and is visible from seaward; there is a noticeable sandy beach, named Kendonga Wailakareh, in the vicinity, and anchorage can be obtained off it by vessels with local knowledge, in a depth of 16 fathoms ($29^{m}3$), sand. About 2¾ miles north-eastward of Waikasaka there is another sandy beach, named Waitelaro, off which

Chart 2759a.

Chart 941b.

anchorage can be obtained by vessels with local knowledge, in a depth of 13 fathoms ($23^{m}8$), stones.

Tanjong Soema (Suma), 10 miles north-eastward of Tanjong Karosso, projects very slightly from the coast; Soema (Suma) village is situated near this point, but only a couple of houses are visible from seaward. There is anchorage for vessels with local knowledge, in a depth of 15 fathoms ($27^{m}4$), sand and coral, with the eastern of the two visible houses in line with a solitary coconut tree on the beach northward of Tanjong Soema, bearing 156°; landing can be effected on the coral reef, but is difficult and dangerous at low water. The tidal streams have been observed to attain a maximum rate of 1½ knots off Soema.

Chart 1696.

Waikelo baai, immediately eastward of Tanjong Waiwala, affords anchorage to vessels with local knowledge, in a depth of 35 fathoms ($64^{m}0$), with a white board at the entrance to Sungei Waikelo, bearing 161°, and the points north-eastward in line bearing 066°. A light is occasionally exhibited from the white board. Reede Waikelo lies southward of a line joining the northern extremity of Tanjong Waikelo and the northern extremity of the point on the western side of the entrance of Sungei Newa, situated about 1½ miles north-eastward of Waikelo.

The bay is bordered by a sandy beach, from which a sand and coral reef extends, rendering it unsuitable for landing. There is reported to be a safe anchorage during the east monsoon.

The coast between Waikelo baai and Reede Memboro, about 19 miles eastward, is mostly steep and rocky, with occasional sandy beaches; the depths are too great close inshore for anchoring. Tanjong Nanga Amba, is a low, rounded, wooded point; Tanjong Kerendi, about 7 miles eastward of Tanjong Nanga Amba, is a low, sandy point. The small village Ketéwil is situated at the mouth of the Loku Ketéwil, which flows out between these two points. Pondokaboemboe village (page 239) is the capital of the Ketéwil district, one of the most fertile in Soemba.

Chart 2468, plan of Memboro road.

Reede Memboro.—Memboro village is situated on a rivulet in the bight between Tanjong Batoembaba and Tanjong Laramanipa, a low sandy point about 5½ miles eastward. Between Memboro and the latter point there is a white sandy beach, with some red rocks and black patches of beach about midway between.

There is anchorage, in a depth of 15 fathoms ($27^{m}4$), sand, off the village. Landing is generally easy, provided attention is paid to the surf on the bar off the river; there are two channels through this bar, both continually shifting and varying in depth. The trees mentioned on page 239 afford some guide for making Reede Memboro, and there is also a noticeable tree, with a flat top, about one mile south-south-eastward of Tanjong Batoembaba. *See* view facing page 248.

Chart 1696.

Coast.—Tanjong Hendak (*Lat. 9° 21′ S., Long. 119° 37′ E.*), about 3 miles east-north-eastward of Tanjong Laramanipa, is an inconspicuous sandy point. Tanjong Wanda is rocky, covered with vegetation, and hollowed out below the high-water line; there is a sandy beach, with occasional patches of rock, between this point and Tanjong

Chart 1696.

Palmedo. Several rivulets, such as the Loku Kapoeli and Loku Ngadoe Boloe, flow out along this part of the coast, but they only afford fresh water during the west monsoon.

Chart 2468, plan of Palmedo road.

Reede Palmedo.—Tanjong Palmedo is a rocky point formed by a spur from a plateau forming the eastern side of the wide, cultivated valley through which Loku Palmedo flows; the bar off the mouth of this river nearly dries at low water. Seven villages stand on or near the river, Palmedo, near the mouth, being the smallest. The place is not always easy to identify from northward, and the villages Wirindolo and Léna (page 239), can only be seen when the mouth of Loku Palmedo bears about 180°.

There is anchorage, in a depth of 16 fathoms ($29^{m}3$), sand and stones, with Léna village in line with the first steep part of the coast westward of the mouth of Loku Palmedo, bearing 165°.

Chart 1696.

Coast.—Eastward of Tanjong Palmedo the coast forms a bight with a sandy beach in it, and thence it becomes rocky as far as Tanjong Sasar. Tanjong Waindé, 6 miles north-eastward of Tanjong Palmedo, consists of steep white rocks; there is a noticeable round-topped tree on the narrow coastal reef close north-eastward of the point, affording a good mark when navigating along this coast.

Tanjong Sasar is a steep point formed by a spur from a ridge, named Datoe (Datu) Sasar, extending about 6 miles southward from the point; this ridge has three summits, and there is a noticeable tree on the eastern slope of the middle and highest one. Tanjong Sasar consists of limestone, and terminates in broken up rock with many crevices; on the western side it rises perpendicularly to an elevation of from 100 to 130 feet ($30^{m}5$ to $39^{m}6$). A fairly strong tidal stream sometimes runs along this point, and it should, therefore, be given a good berth when rounding it.

Charts 941b, 942a.

NORTH-EASTERN SIDE OF SOEMBA.—Aspect.—Except for the two prominent points Tanjong Ngaroe Roehoe (Ngaru Ruhu) and Tanjong Batoe Ata, about 18 and 38 miles south-eastward of Tanjong Sasar, respectively, the north-east coast of Soemba affords few distinctive features for vessels passing at a distance. The coast is mostly flat, wooded with high trees, and bordered by a sandy beach, with occasionally rock; the land behind rises generally in terraces, with extensive grass plains.

About 9 miles south-south-eastward of Tanjong Sasar (*Lat. 9° 17′ S., Long. 119° 56′ E.*), and 2½ miles inland, there is a noticeable ravine through which Sungei Kadessa flows; the sides of this ravine are 665 feet ($202^{m}7$) high, and the southern side is very sharply defined. Kapoendoek (Kapunduk) village, standing on the eastern slope of a ridge 3½ miles south-eastward of the ravine, is visible from seaward, and there is a noticeable white patch close north-eastward of it; Kanata village, on the hills about 5 miles south-westward of Tanjong Ngaroe Roehoe, is also visible from seaward.

Laoendoe (Laundu), a hill, 422 feet ($128^{m}6$) high, on Tanjong Ngaroe Roehoe, has a more or less flat top and is the northern extremity of a steep, rugged wall forming the eastern edge of the tableland on the

Chart 2759a.

western side of Nangamessi baai. About 3 miles south-south-westward of Laoendoe the tableland rises gradually to another flat summit, named Lakabota, 1,570 feet ($478^{m}5$) high.

Coast.—For about one mile southward of Tanjong Sasar there is a sandy beach, and thence the coast is rocky until just southward of Tanjong Roda, 6 miles south-eastward of Tanjong Sasar, whence an almost uninterrupted stretch of sand continues to Tanjong Ngaroe Roehoe. The drying coastal reef is very narrow, and is only varied at the mouths of Sungei Kadessa and Sungei Kanata. The depths within the 100-fathom ($182^{m}9$) line are very irregular, and the bottom is too steep to afford good anchorage. Eastward of the white patch near Kapoendoek village, and nearly half a mile offshore, are two reefs; the north-western reef dries, and there is a depth of one fathom ($1^{m}8$) on the south-eastern; there is a depth of 3¾ fathoms ($6^{m}9$) between these reefs and the coast.

Tanjong Ngaroe Roehoe is low; it should be given a good berth, as a strong tidal stream sometimes sets round it, causing whirlpools.

Nangamessi baai.—Nangamessi baai is entered between Tanjong Ngaroe Roehoe and Tanjong Batoe Ata, and is of some importance to shipping owing to the fact that Waingapoe, the main exporting place in Soemba, is situated in its south-western corner. In the northern part of the western side of the bay the tableland comes close to the coast, retreating farther inland in the southern part, where there is a flat coastal strip about 2 miles wide in the vicinity of Tanjong Tai Manoek (Manuk), situated about 10 miles south-south-eastward of Tanjong Ngaroe Roehoe. Data, 1,629 feet ($496^{m}5$) high, with a narrow ravine on each side, rises at the southern end of the tableland, 3 miles west-south-westward of Tanjong Tai Manoek; it is not very noticeable, as it is hidden by the curve of the tableland except when bearing more than about 270°. Between Tanjong Ngaroe Roehoe and Tanjong Maoedoeloe (Maudulu), 4½ miles south-south-eastward, the western shore of the bay is rocky, with several small sandy beaches; Tanjong Waiboeboe, between these two points, is noticeable for its high, steep part immediately southward of it. Between Tanjong Maoedoeloe and Oetaleoemboe village, 3 miles southward, the shore is covered with mangroves, behind which is a strip of sand, and thence to Waingapoe there is a sandy beach; there is a noticeable white patch on the wall of the tableland westward of Oetaleoemboe village.

The southern shore of the bay has no particularly noticeable features, but Data is a good landmark when navigating along this shore. Tanjong Batoe Ata (*Lat.* 9° *37′ S., Long.* 120° *28′ E.*) is a sandy, wooded point, and a fairly strong tidal stream sometimes runs close off it. The shore between this point and Tanjong Djoemboe, about 4½ miles westward, is low and bordered by a sandy beach and a reef which extends about 4 cables offshore in places with trees behind; a noticeable tree, higher than the others, stands about midway between these two points. From Tanjong Djoemboe to Waingapoe the shore is muddy and covered with mangroves. Sungei Djoemboe flows into an almost drying inlet close westward of Tanjong Djoemboe, but the tortuous entrance to the river is shoal and liable to change; two wooded islets lie on the eastern side of the entrance to the inlet.

Anchorages.—The depths in Nangamessi baai are very great until close under the shore, and, except for Reede Waingapoe and

Charts 941b, 942a.

Telok Kambaniroe (page 244), there are no good anchorages with winds between north and east. On the western side of the bay anchorage may be obtained by vessels with local knowledge off the sandy beach between Oetaleoemboe village and Tanjong Tai Manoek, in depths of from 19 to 25 fathoms ($34^{m}7$ to $45^{m}7$), sand and coral; with offshore winds it is possible to anchor off the coast northward of Oetaleoemboe village.

Anchorage can be obtained by vessels with local knowledge close to the coastal reef off the southern shore of the bay, but, if anchoring eastward of Telok Kambaniroe, a vessel will be exposed to westerly winds also.

Chart 2468, plan of Waingapu road.

Reede Waingapoe. — Light. — Beacons. — Dangers. —Reede Waingapoe, bounded by the parallel of 9° 37′ 30″ S., and the meridian of 120° 16′ E., affords secure but confined anchorage at all times. The inlet is entered between Tanjong Tai Manoek and Tanjong Atoe (Atu), about 1¼ miles south-eastward. Kabaroe (Kabaru) village, close within Tanjong Tai Manoek, and Tai Manoek village, about 3 cables inland and the seat of the Rajah of that district, are hidden by trees. The southern part of the inlet is divided into two arms by a projecting point, on which is the village Maoedjawa (Maujawa); Kerita village stands a little farther inland, but neither village is visible from seaward until close to the entrance of the inlet, when a couple of high roofs of Kerita can be seen.

There is a swept channel about 3 cables wide, on the line of the leading beacons, leading into the roadstead.

Waingapoe, on the eastern side of the inlet, is the headquarters of a Government official; the lower part of the village contains some fairly large houses. The upper village, situated on a rocky slope farther southward, is inhabited by Buginese and people from Endé, whilst Soembanese dwell on the slope south-eastward; the houses of the Government official are in the latter part. There is a stone pier with a landing stage for boats at Waingapoe, with a depth of 7 feet ($2^{m}1$) alongside its head. There is a light exhibited from a post on the head of the pier, and a flagstaff at the root. There are some black sheds with zinc roofs near the root of the pier, and a large white house with red roof about one cable southward of the pier, which are noticeable from the roadstead. Provisions and drinking water from wells can be obtained in moderate quantities. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Tanjong Atoe (*Lat. 9° 38′ S., Long. 120° 16′ E.*) is sandy and covered with mangroves; it is fringed by a reef, which dries, extending about 3½ cables northward, and a detached reef, with a least depth of 3 feet ($0^{m}9$) over it, lies close northward of the coastal reef. Telok Melala is a small inlet in the coastal reef immediately eastward of Tanjong Atoe.

A reef, with a depth of 1½ fathoms ($2^{m}7$) over it, lies 3 cables eastward of Tanjong Tai Manoek, and is marked by a beacon surmounted by a white ball; a rock, with a depth of 6 feet ($1^{m}8$) over it, lies 1½ cables north-westward of this beacon, and a reef, with a depth of 5 fathoms ($9^{m}1$) over it, not marked by discoloration, lies about 2 cables eastward of the beacon. A beacon surmounted by a white ball marks the edge of the coastal reef on the western side of the entrance to the

Chart 2759a.

Chart 2468, plan of Waingapu road.

inlet, and a similar beacon marks the northern edge of the reef extending from the projecting point at the head.

Two white stone pyramidal beacons, about 2 cables apart, stand at the head of the inlet about 2 cables westward of the pier-head, and in line, bearing 188°, lead to the anchorage between the reefs on either side.

Anchorage.—The best anchorage is just within the entrance to the inlet, in a depth of 16 fathoms (29^{m}3), mud and sand, with the two pyramidal beacons in line and Tanjong Atoe bearing 106°; this position is about one cable from the reefs on either side. Small vessels can anchor closer in, at the entrance to either arm of the inlet, in a depth of about 12 fathoms (21^{m}9); the western arm is more spacious, but has a hard bottom, whilst that of the eastern is stiff mud. An anchor has been embedded in the northern extremity of the reef between the two arms, and may be used as a landfast.

In the outer road there is anchorage, in a depth of 19 fathoms (34^{m}7), just westward of the leading line, with the northern pyramid bearing 183°, and Tanjong Himboe Bakoe, a low mangrove point about 1¼ miles eastward of Tanjong Atoe, bearing 116°.

Charts 941b, 942a.

Telok Kambaniroe.—Telok Kambaniroe is a spacious bay entered eastward of Tanjong Pasia Manoek, 2½ miles eastward of Tanjong Atoe, and although the depths are irregular it affords good anchorage to vessels with local knowledge at the head, off the mouth of Kali Kambera, in a depth of about 25 fathoms (45^{m}7). On the western side of the bay is a large grassy plain, with a sandy beach and numerous coconut trees; the eastern shore is covered with mangroves, with high trees behind.

Kali Kambera is the most important river in Soemba, but its mouth, about three-quarters of a cable wide, is obstructed by sandbanks which nearly dry; within the bar there is an average depth of about 10 feet (3^{m}0). Just within the mouth the river turns sharply westward for about one mile to Kambaniroe village, where there is a missionary settlement, and then turns again southward; an islet lies in mid-stream a little distance below the village, and there are some rocks under water under the right bank.

Coast.—From Tanjong Batoe Ata to Tanjong Rendi (*Lat. 9° 54′ S., Long. 120° 42′ E.*), about 22 miles south-eastward, the coast is fronted by an uninterrupted sandy beach, with a narrow coastal reef in places, with trees behind, the hills rising in flat terraces farther inland. Anchorage can be obtained by vessels with local knowledge almost anywhere along this part of the coast.

Between Tanjong Batoe Ata and Tanjong Maoedjawa (Maujawa), 6 miles south-eastward, the coast forms a bight affording anchorage to vessels with local knowledge off the mouth of Kadoemboel (Kadumbul) rivier; this river is fairly broad, but is obstructed by a bar. Kadoemboel village is situated a few miles inland and is not visible from seaward; Maoedjawa village, close westward of Tanjong Maoedjawa, is not particularly noticeable.

Tanjong Toeak (Tuak), 4½ miles south-eastward of Tanjong Maoedjawa, is a flat point covered with grass, and has two groups of high coconut trees on it. Tanjong Petawang, about 4 miles south-south-eastward of Tanjong Toeak, is wooded and fairly noticeable. Tanjong

Chart 2759a.

Charts 941b, 942a.

Rendi is only remarkable for the sandy beach which changes to a mud strip covered with mangroves.

Chart 2468, plan of Melolo road.

Reede Melolo.—Melolo village, situated at the mouth of the small river of that name, which flows out about 2¼ miles north-westward of Tanjong Rendi, has a mixed population, including Chinese, and conducts a brisk trade with Mima, on the south-east coast of Soemba, Ende, and Boeton; the mosque and a long house with a zinc roof are visible from the roadstead. The larger village Kedanga Boeko (Buko) lies about one mile north-westward of Melolo.

The best anchorage is in a depth of 18 fathoms (32^{m}9), mud and sand, with a white pyramid about 3 cables south-westward of the mosque bearing about 220°, but the roadstead is entirely open to northerly and easterly winds; it is not advisable to anchor closer in, as the bottom rises very steeply near the coastal reef, which extends as much as 2¾ cables offshore. At high water and in calm weather the best landing place is at the mouth of the river which dries; under other conditions at the sandy beach north-westward of it.

Chart 1697.

Coast.—Between Tanjong Rendi and Tanjong Oendoe (Undu), a low sandy point about 14 miles south-eastward, the tableland at the eastern end of Soemba retreats farther from the coast, leaving a wide track of low, sparsely wooded land, fringed by a reef, which dries, extending about 1¼ miles offshore. Tanjong Wara Djangga (Jangga), 3½ miles east-south-eastward of Tanjong Rendi, is wooded and not particularly noticeable; Wara Djangga (Jangga) village stands close westward of the point, and is visible on some bearings. There are occasional fishing huts along the coast and praus often lie in Lola Jeri, a small bight about midway between Tanjong Rendi and Tanjong Wara Djangga.

Tanjong Tapi, 2½ miles south-eastward of Tanjong Wara Djangga, is a rocky, wooded point, with rocks lying on the coastal reef; between these two points is a sandy beach, named Pasir Tapi, which forms a break in the monotonous growth of mangroves along the coast south-eastward of Tanjong Rendi. South-eastward of Tanjong Tapi the coast is again sandy and sparsely wooded, except for a rocky patch at Tanjong Matawaitemboeloe, about 3¼ miles south-eastward of Tanjong Tapi.

Kaliboeara (Kalibuara) village, about one mile southward of Tanjong Matawaitemboeloe (*Lat. 9° 59′ S., Long. 120° 50′ E.*), is inhabited by fishermen, and the high roofs of some of the houses are noticeable; praus cross the coastal reef, which extends about one mile offshore here, at high water. Nusa Manoek (Manuk) is an uninhabited islet, with a few trees on it, lying on the coastal reef about 1½ miles south-eastward of Kaliboeara village; a large tree, resembling an islet from a distance, stands on the sandy patch extending from its western side.

Menanga Bodi, a small river flowing out on the northern side of Tanjong Oendoe, can be entered by praus at high water; at low water the entrance is closed by the drying coastal reef, but at half tide there is a depth of 5 feet (1^{m}5) in the mouth.

Off-lying dangers.—Anchorage.—About 2¾ miles eastward of Tanjong Oendoe a ridge of coral runs parallel with the coast for a distance of about 5 miles. Except for a 3¼-fathom (5^{m}9) patch, which

Chart 2759a.

Chart 1697.

lies about 3½ miles north-eastward of Tanjong Oendoe and is only slightly marked by discoloration, there are depths of from 6 to 6½ fathoms (11^m0 to 11^m9) on this ridge. A 10-fathom (18^m3) patch lies about 4 miles eastward of the same point.

There is good anchorage, more or less sheltered in both monsoons, between the coastal reef and the inner ridge, in depths of from 12 to 16 fathoms (21^m9 to 29^m3).

Charts 941b, 942a.

SOUTH-EASTERN SIDE OF SOEMBA.—Aspect.—Except in the neighbourhood of Tanjong Ngoendjoe (Ngunju), the southern extremity of Soemba, this coast has few distinctive features; it is bordered almost throughout by a sandy beach, only broken in a few places by rocky patches. Behind the beach are extensive grass plains, which are sparsely wooded. Some miles inland the land rises in terraces to a low tableland, which ascends gradually to the mountainous land in the interior. Northward of Tanjong Ngaroe (Ngaru) Mangeh, and about 12 miles north-eastward of Tanjong Ngoendjoe, there is a prominent cleft in the edge of the tableland, with sides about 525 feet (160^m0) high.

Anchorages.—There are no entirely sheltered anchorages on this coast, but some protection from the sea in the bight eastward of Tanjong Ngaroe Mangeh and eastward of Tanjong Watoe Perono may be obtained, but there is no shelter from the south-easterly wind, which may blow with considerable force, especially in May and June. During these months the native coastal navigation, which is fairly brisk at other times, is entirely quiet.

Shelter may be obtained during the west monsoon, but a south-westerly swell can be occasionally troublesome. Shelter is afforded westward of Tanjong Watoe Perono, and, to a lesser degree, eastward of Tanjong Ngaroe Mangeh, and off Wai Djéloe.

Coast.—Dangers.—Tanjong Diabaré, about 3 miles south-westward of Tanjong Oendoe, is merely a slight projection of the beach and is scarcely noticeable. Between this point and Tanjong Batoe (Batu) Laga, about 5½ miles south-westward, the coast forms a bight affording sheltered anchorage in the west monsoon; the small fishing villages Maoekewau and Waiboei, with the Mendjeli rivulet flowing out between them, lie on this part of the coast. A 6-fathom (11^m0) patch lies about one mile offshore and about 2 miles south-westward of Tanjong Diabaré.

Benda village, barely visible from seaward, is situated about one mile west-south-westward of Tanjong Batoe Laga. There is a basin in the coastal reef off the village, and small vessels with local knowledge can obtain temporary anchorage during the daytime, in depths of from 7 to 9 fathoms (12^m8 to 16^m5), off the entrance; landing can always be effected on the inner side of the basin. When the drying coastal reef is covered the only landmarks are Tanjong Batoe Laga and the mouth of Oeda rivier, which forms a lagoon behind the beach; the southern extremity of the coastal reef on the western side of the anchorage is usually marked by surf.

Tanjong Nangoe Wara (*Lat. 10° 13′ S., Long. 120° 42′ E.*), 4 miles west-south-westward of Tanjong Batoe Laga, is a low, flat, rocky point. A ridge, with an average depth of 4 fathoms (7^m3) over it, but with a small 1¼-fathom (2^m3) patch in the middle, which is sometimes marked

Chart 2759a.

Charts 941b, 942a.

by discoloration, runs parallel with the coast, and about one mile from it, off Tanjong Nangoe Wara ; with a heavy swell the sea often breaks on the shoal part of this ridge. About one mile farther westward there is another ridge, with a least depth of 4¼ fathoms (7^{m}8) over it.

Tanjong Ngaroe (Ngaru) Mangeh, 4¼ miles west-south-westward of Tanjong Nangoe Wara, is low, wooded, and bordered by a sandy beach. The coastal reef off Tanjong Ngaroe Mangeh and that about 2 miles westward extends as much as 6½ cables offshore. A 6-fathom (11^{m}0) patch lies about 1½ miles eastward of Tanjong Ngaroe Mangeh. Eastward of the point is a bay affording moderately sheltered anchorage in the west monsoon, into which the small streams Boroe and Toendoe Wai flow ; the latter has a wide, shoal mouth, with a bar off it, on which there is frequently surf. Mima, a settlement of Buginese traders, is situated on the western side of the point. About 2 miles westward of Mima there is an inlet in the coastal reef, named Watoe Liboe, where landing can nearly always be effected, even with a heavy south-westerly swell ; the place is not easily identified from seaward, but the opening in the reef will be seen when the steep slopes of the plateau behind Tanjong Ngaroe Mangeh bear 059°. At high water praus proceed from this inlet through channels in the broad coastal reef to Mima.

Tanjong Watoe Perono, about 6 miles westward of Tanjong Ngaroe Mangeh, can be easily identified by the white cliffs of limestone formation at its extremity, and also by some hills, covered with reeds and bushes, rising steeply from the sea. These white patches do not occur farther eastward, but they may be seen as far westward as a position 3 miles north-north-eastward of Tanjong Ngoendjoe. There is a very good landing place on the eastern side of Tanjong Watoe Perono. In the bay eastward of Tanjong Watoe Perono the depths are very regular, and, although somewhat open, good anchorage can generally be obtained, by vessels with local knowledge, either on the eastern or western side, according to the prevailing wind. Wai Djéloe flows into the bay, and Bai village, a settlement of the Rajah of the district, is situated on this river 2 miles inland.

About 2 miles southward of Tanjong Watoe Perono, just within the 10-fathom (18^{m}3) line, are two reefs with depths of 1¾ and 2¾ fathoms (3^{m}2 and 5^{m}0) over them, respectively ; the outer sides of these reefs are steep-to, and at low water the sea generally breaks on them. A 4¾-fathom (8^{m}7) patch lies about one mile south-eastward of Tanjong Watoe Perono ; a coastal reef, extends from one to 3 cables from this point and from the coast for about 3 miles south-westward.

Tanjong Ngoendjoe or Blackwood point is a very useful landmark for vessels approaching this island from either eastward or westward ; it terminates in a steep peninsula, 150 feet (45^{m}7) high, connected to the main island by a narrow isthmus which partly covers at high water. The point (*Lat. 10° 19′ S., Long. 120° 28′ E.*) is formed by Pengadoe Sasa gebergte, which is steep and rises close to the sea to an elevation of 1,570 feet (478^{m}6) ; the crest of this range has no noticeable summits (*see* page 238). The numerous masses of rock along the coast are of a reddish-brown colour ; a high white rock lies about one cable eastward of the isthmus. On the western side of Pengadoe Sasa gebergte, and about 4 miles north-westward of Tanjong Ngoendjoe, there is a hill near the coast, 658 feet (200^{m}6) high, with

Chart 2759a.

a noticeable white patch on its south-western side. *See* view facing this page. Tide-rips have been observed close southward of the point.

SOUTH-WESTERN SIDE OF SOEMBA.—Aspect.—This coast generally rises steeply from the sea, with here and there perpendicular rocky cliffs, and nearly throughout is rendered almost inaccessible by the continual surf caused by the heavy swell; although the depths admit of vessels with local knowledge anchoring almost anywhere under the coast, there is, with the exception of Lamombang baai and Malékaba baai, practically no shelter. In the south-eastern part of this coast, between Tanjong Njoendjoe and Tanjong Melangoe (Melangu), about 29 miles west-north-westward, the off-lying islands and the more or less conspicuous summits near the coast are useful when making the land; westward of Tanjong Melangoe there are no distinctive peaks.

Monsoon current.—At a distance of one mile and more from the coast a current in the direction of the prevailing monsoon has been generally observed, with a maximum rate of 1½ knots.

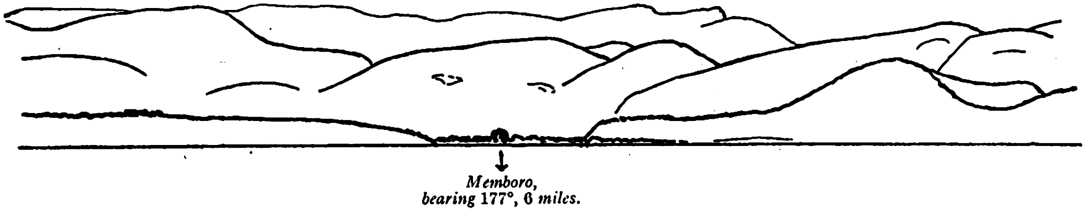
Off-lying islands.—Lahaloera (Lahalura), the eastern and largest of the off-lying islands, lies about 14 miles westward of Tanjong Ngoendjoe and about 3 miles southward of Tanjong Kahanga Eia; it is a rocky island, covered with reeds and palm trees, and attains an elevation of 1,038 feet (316^{m}4) in the eastern part. In the middle of the island is a sharp, regular, conical summit 973 feet (296^{m}6) high; the western extremity is a low, narrow point bordered by a sandy beach. A reef extends about half a mile from the southern and western sides of the island, and there is a very prominent pillar rock on it, about 2 cables southward of its western end. *See* view facing this page.

Kotak, situated on the north-western edge of the reef extending from Lahaloera, is a dome-shaped islet, 212 feet (64^{m}6) high, with several rocks close around it.

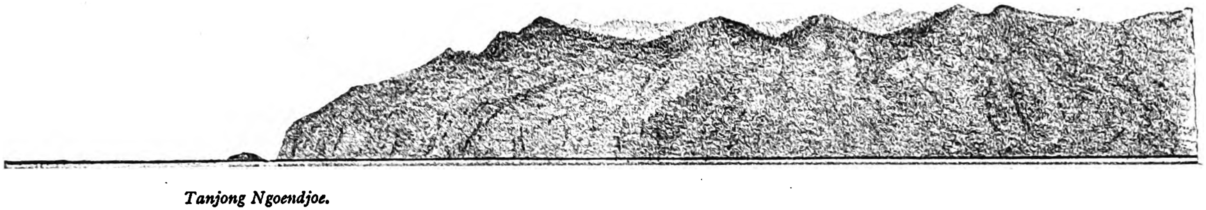
Mangoedoe (Mangudu), about 2½ miles westward of Lahaloera, is relatively low, and, except on its northern side, is fringed by a reef which extends from about 3 to 6½ cables offshore. The coast rises vertically and is bordered by a sandy beach; just within the coast the island sinks to a grassy hollow and then rises slightly again towards the middle, where there are a few trees.

These islands are uninhabited, but Lahaloera is frequently visited by natives from Soemba, who use it as a temporary storing place for forest produce collected in the almost uninhabited southern part of that island and search for turtle. There is a good well of fresh water near the western extremity of Lahaloera. Anchorage can be obtained by vessels with local knowledge off the north and east coasts of Lahaloera. The sea generally breaks heavily on the reefs fringing the islands, particularly on that of Mangoedoe; there is a clear passage, with depths of 24 fathoms (43^{m}9), between Mangoedoe and the reef extending westward from Lahaloera. Strong eddies and tide-rips have been observed around the islands.

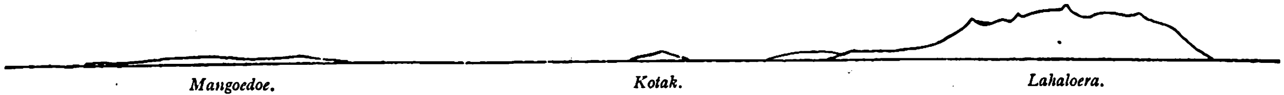
Coast.—Tanjong Karera (*Lat. 10° 15′ S., Long. 120° 18′ E.*) and Tanjong Woenoe, two points close together about 10 miles west-north-westward of Tanjong Ngoendjoe, are rocky and steep; two high rocks, the eastern square and the western pointed, lie close off the first-named point. Under favourable circumstances landing can be effected on



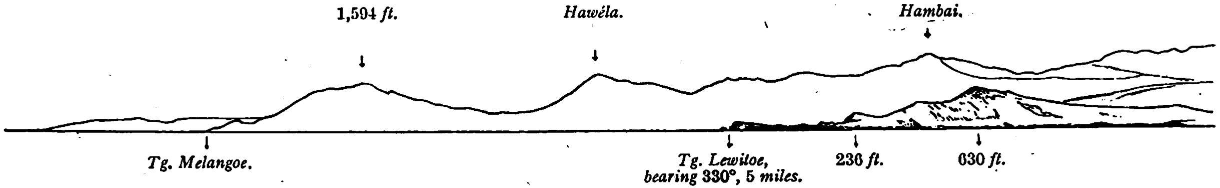
Soemba, north coast. Approach to Reede Memboro.
(*Original dated* 1931.)


Tanjong Ngoendjoe.

Soemba, south coast. Tanjong Ngoendjoe, bearing 265°.
(*Original dated* 1906.)

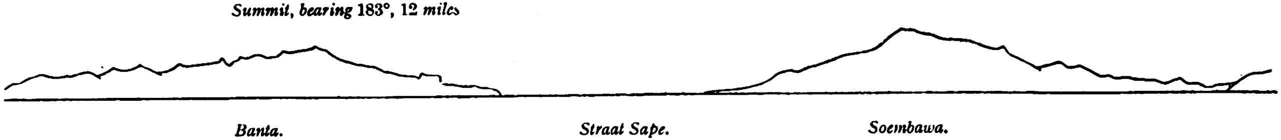


Soemba, south coast, Lahaloera, bearing 056°, distant 12 miles.
(*Original dated* 1947.)

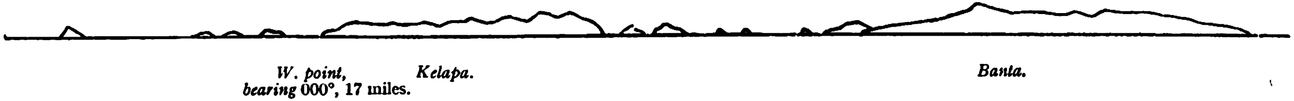

1,594 *ft.*
Hawéla.
Hambai.
Tg. Melangoe.
Tg. Lewitoe,
bearing 330°, 5 miles.
236 *ft.*
630 *ft.*

Soemba, south coast. Tanjong Lewitoe and vicinity.
(*Original dated* 1931.)

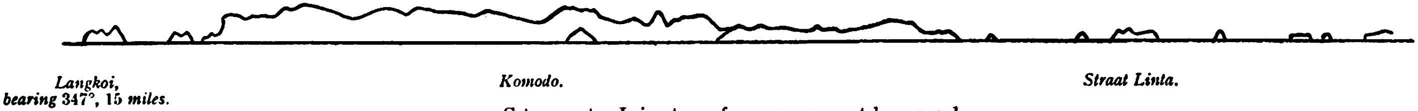
To face page 249.



Straat Sape, northern entrance.
(Original dated 1906.)



Islands in Straat Sape from southward.
(Original dated 1906.)



Straat Linta from southward.
(Original dated 1906.)

Charts 941b, 942a.

a small sandy beach at the mouth of a rivulet about half a mile north-eastward of Tanjong Karera. About 2½ miles north-eastward of this point there is a prominent summit, 1,235 feet ($376^{m}5$) high and steep on its southern side; about half a mile northward of this summit, and connected to it by a ridge, is a rounded summit, covered with reeds and 1,295 feet ($394^{m}7$) high, with a dark rock on the top. Parai Hau village is situated on the eastern slope of these two mountains. A reef, with a depth of one foot ($0^{m}3$) over it, lies 1½ miles westward of Tanjong Woenoe and about 8 cables offshore.

Tanjong Kahanga Eia, nearly 4½ miles westward of Tanjong Woenoe, is a bare, hilly point with two high rocks close off it, the eastern of which is named Watoe Perandja. Tanjong Hauli, 3¼ miles west-north-westward of Tanjong Kahanga Eia, is a very prominent bare point, 225 feet ($68^{m}6$) high, with white sides. Taraba baai, between these two points, is of some importance owing to the fact that communication with the interior is easy; at the head of the bay is a sandy beach, and thence a plain extends far inland to the foot of Massoe gebergte and curves eastward behind the eastern entrance point of the bay. The depths decrease regularly, especially in the western part, where there is convenient anchorage for vessels with local knowledge, in depths of from 7 to 10 fathoms ($12^{m}8$ to $18^{m}3$); in the west monsoon this anchorage is sheltered by Tanjong Hauli, and the off-lying islands somewhat shelter it from the southerly swell. In bad weather vessels can seek shelter under the lee of Lahaloera. Taraba rivier, which carries a considerable amount of water, flows through the plain, forming a marshy lagoon behind the sandy beach and thence flows into the sea through a wide mouth; there is, however, a very shallow bar off the mouth, on which there is always considerable surf. Landing can usually be effected at either end of the sandy beach, according to circumstances.

Massoe gebergte, rising at the back of the plain behind Taraba baai, has no noticeable peaks from a distance, but the two highest peaks, with elevations of 4,014 and 3,604 feet ($1{,}223^{m}5$ and $1{,}098^{m}5$), respectively, are visible from the bay. Katoendoe, about 4½ miles north-north-westward of Tanjong Hauli, and at the south-western end of the range, is a regular, wooded cone, 1,767 feet ($538^{m}6$) high, and is fairly prominent when near the coast.

Tanjong Lewitoe (Lewitu), about 6 miles north-westward of Tanjong Hauli, consists of red rock, sparsely covered with vegetation, and rises steeply from the sea; a short distance within the point are two hills, 231 feet ($70^{m}4$) and 625 feet ($190^{m}5$) high, respectively. *See* view facing page 248. A rock, which only covers at high water, lies 3 cables west-north-westward of Tanjong Lewitoe (*Lat. 10° 11′ S., Long. 120° 05′ E.*), and there are several noticeable rocks close off the coast north-westward of the point. On the western side of the point there is a small sandy beach in a crevice in the rocky coast, where landing can generally be effected between half tide and high water. About 2¼ miles north-westward of Tanjong Lewitoe there is a prominent house near the coast, with a village, not visible from seaward, behind it.

Tanjong Melangoe (Melangu), an outstanding promontory about 5½ miles north-westward of Tanjong Lewitoe, is one of the most prominent points of Soemba. The point itself consists of a mass of rock connected by a narrow crest to the dark, rocky land behind, which

Chart 2759a.

Charts 941b, 942a.

rises steeply to an elevation of nearly 1,600 feet (487^{m}7); 1½ miles eastward of this summit and joined to it by a low saddle, is a sharp peak named Hawéla, 1,717 feet (523^{m}4) high. Hambai, 2,380 feet (725^{m}4) high, nearly 2 miles north-eastward of Hawéla, is also noticeable. Two large rocks above water lie close off Tanjong Melangoe.

Chart 941b.

Telok Wahang, on the northern side of the promontory of Tanjong Melangoe, has a beach of sand and stone, but the almost constant swell and surf makes landing difficult; behind the beach is a small plain with a rivulet flowing through it. Wahang village is situated on a hillock on the western side of the plain, and there are several other villages in the vicinity.

Between Telok Wahang and Tanjong Waroeng Dewa, about 4½ miles northward of Tanjong Melangoe, the coast is steep and rocky, with a number of rocks lying close off it; north-westward of Tanjong Waroeng Dewa there is a sandy beach again. About 2 miles northward of this point is a hill with a bare summit, 1,097 feet (334^{m}4) high.

Tanjong Laparoenoe, about 3½ miles north-westward of Tanjong Waroeng Dewa, has three high pillar rocks off it, the outer one being very noticeable owing to its peculiar needle shape.

Malékaba baai.—Lamombang baai.—These two bays, entered about three-quarters of a mile and 4 miles, respectively north-westward of Tanjong Laparoenoe, afford the best anchorages on the south-west coast of Soemba, as they are in some measure protected by the broad coastal reef extending from their entrance points, especially in the South-east monsoon; although they are less protected during the west monsoon, vessels can generally obtain calm anchorage in Malékaba baai, and communication with the shore can be maintained. At the head of both bays is a sandy beach, with low swampy ground behind. The land between the two bays consists of steep, rather low limestone hills, and the coast is partly bordered by a sandy beach, with white cliffs in places; Watoe Bakoel, 3 miles north-westward of Tanjong Laparoenoe, is a rock, 83 feet (25^{m}3) high, lying on the coastal reef, which extends about 2½ cables offshore here. A rivulet flows into the north-western corner of Malékaba baai, and there is a shed for praus at the mouth; this is the best landing place in the west monsoon.

Malékaba baai can be entered by steering for the wooded mountain, 1,659 feet (505^{m}7) high, situated about 5 miles north-north-eastward of Tanjong Laparoenoe, bearing 038°; this mountain can be identified by a tree projecting high above it. When Watoe Bakoel is open clear of the eastern entrance point of Lamombang baai, bearing about 297°, course can be altered slightly eastward until in a convenient depth and at a suitable distance from the shore; Watoe Bakoel in line with Tanjong Bata Lando (*Lat. 9° 59′ S., Long. 119° 57′ E.*), situated about 1½ miles eastward of Watoe Bakoel, bearing about 275°, is a useful mark for this purpose.

Entering Lamombang baai vessels should hold nearer the north-western side, as a reef, with a least depth of 2¾ fathoms (5^{m}0) over it, extends nearly half-way across the entrance from the south-eastern side.

Coast.—Dangers.—Kakadoe (Kakadu) baai, entered about 1½ miles north-westward of the north-western entrance point of Lamombang baai, is a spacious, though open, bay with moderate

Chart 2759a.

Chart 941b.

depths. The eastern side is formed by low limestone wooded hills; the eastern entrance point consists of bare, steep limestone, and there is a flat, rocky islet close off it. The north-western shore is formed by steep, rocky cliffs. At the head of the bay is a strip of sand, behind which the land rises gradually to a wooded mountain, 1,229 feet ($374^{m}6$) high. The bay affords little shelter for anchoring, but there is a good landing place on the eastern shore, about half a mile northward of the east point of the bay; on the southern side of the position the coastal reef projects about one cable, and affords good shelter, especially at low water.

The coast between Tanjong Kakadoe, the north-western entrance point of Kakadoe baai, and Tanjong Ngoengoe (Ngungu) Wawi, about 3½ miles westward, consists mainly of white and grey cliffs, with numerous rocks lying close offshore; about half a mile westward of Tanjong Kakadoe there is a noticeable triangular white patch just above the cliffs. Tanjong Ngoengoe Wawi is a steep, rocky peninsula, covered with vegetation and connected to the mainland by a very narrow isthmus; just within the point is a hill, 664 feet ($202^{m}4$) high.

About 1¼ miles north-westward of Tanjong Ngoengoe Wawi several islets and rocks extend from the coast; the outermost islet, named Bola Komba, lies about 4 cables offshore and consists of three plateaus, the two outer being connected by a natural bridge. In favourable circumstances anchorage can be obtained by vessels with local knowledge on either side of Bola Komba, in a depth of about 15 fathoms ($27^{m}4$). There is a sandy beach here, on which the surf beats almost incessantly, and a plain runs some distance inland; the small river Kiriwai flows out through the north-western part of this plain, and the coast then becomes high and rocky again. A number of noticeable, pointed, black rocks lie close off the coast north-westward of the mouth of the Kiriwai.

Watoe Sipoe, a wooded islet, 290 feet ($88^{m}4$) high, lies about 6 miles north-westward of Tanjong Ngoengoe Wawi, and is connected to the coast by a reef, which dries; it is a good mark when navigating close off the coast. A rock, which dries, lies about 2½ miles south-eastward of Watoe Sipoe and 2¾ cables offshore; close eastward of Watoe Sipoe is a chain of rocks, and close northward there is a small bay, in which there are some rocks, which dry, the outermost of which only covers at high water, and lies about 2¾ cables offshore. A ridge, with a least depth of 6 fathoms ($11^{m}0$) over it, extends southward from these rocks.

Tanjong Marongi (*Lat. 9° 50′ S., Long. 119° 41′ E.*), about 2¼ miles north-westward of Watoe Sipoe, is a fairly steep, rocky point, covered with reeds; there are numerous rocks close off the coast south-eastward of this point.

Sipoe (Sipu) baai, entered between Tanjong Marongi and Tanjong Lahikeméme, about 3½ miles north-westward, has convenient depths for anchoring, especially in the western part, where it is somewhat sheltered in the west monsoon; in the South-east monsoon it is probably more sheltered on the eastern side. Except close under the shores, where there are a number of rocks and two islets, the bay is free from danger; Tanjong Lahikeméme is a low sandy point fringed by a reef which extends nearly 3 cables offshore. On the eastern shore, about 2 miles northward of Tanjong Marongi, there are some prominent steep black cliffs.

Chart 2759a.

Chart 941b.

Sendikeri baai is separated from Sipoe baai by a broad tongue of land terminating in Tanjong Lahikeméme. The eastern entrance point of the bay, about three-quarters of a mile north-north-westward of Tanjong Lahikeméme, is formed by a narrow spur terminating in a hillock; some rocks, above and below water, lie about 2 cables westward of this point. About 1½ miles north-westward is Tanjong Ta Atoe, the north-western entrance point of the bay, which rises somewhat at its outer end and has a few large trees on it; a noticeable, conical rock, covered with vegetation, lies about one mile eastward of the point and 2½ cables from the western shore. A small rock above water lies about 3 cables offshore midway between the conical rock and Tanjong Ta Atoe, and a 3¾-fathom ($6^{m}9$) patch lies about half a mile south-eastward of Tanjong Ta Atoe.

The depths in the bay decrease regularly towards the head and the holding ground is good, but there is no shelter from the ocean swell; owing to the coastal reef and swell landing is difficult.

The coast between Sendikeri baai and Tanjong Karosso, the western extremity of Soemba, can be safely approached, as there are no dangers outside the 10-fathom ($18^{m}3$) line; the surf on the coastal reef, caused by the ocean swell, can be plainly seen, even at night. The mountains within this part of the coast present few remarkable features by which they may be identified; Lamboja, about 18 miles west-north-westward of Tanjong Ta Atoe, and about 4½ miles inland, has a conical summit, 2,184 feet ($665^{m}7$) high.

The coast between Tanjong Ta Atoe and Tanjong Roea (Rua), 12 miles westward, forms several unimportant bays; Loku Lisi, the bay immediately westward of Tanjong Ta Atoe, has a fairly high islet on the coastal reef extending about 2 cables from its eastern shore; Tengiri baai, entered about 1½ miles westward of Loku Lisi, may be identified by a noticeable dark rock, with a flat top, lying about 2 cables off its western entrance point; Lia baai, entered about 1¾ miles west-north-westward of Tengiri baai, has a noticeable hummock on its western entrance point, and landing can be effected here; Manoekaka baai, entered about one mile west-north-westward of Lia baai, has a long sandy beach, with a plain behind it extending some distance inland; Loku Manoekaka flows out in the western part of this bay and can be entered by praus. There is a moderately good anchorage for vessels with local knowledge in the bight between Tanjong Ngoedjoe, the western entrance point of Manoekaka baai, and Tanjong Roea, as it is more or less sheltered from the swell; the best position is off the mouth of Loku Roea, in a depth of about 10 fathoms ($18^{m}3$), and landing is practicable here.

Tanjong Roea (*Lat. 9° 48′ S., Long. 119° 24′ E.*) is formed by a gently sloping spur; a small square wood above the point, at an elevation of 441 feet ($134^{m}4$), is noticeable from westward. Several villages stand on the hills near Tanjong Roea, and their pointed roofs are often visible above the trees. Ngoedjoe village, about 2¼ miles westward of Tanjong Ngoedjoe and about three-quarters of a mile from the coast, can be identified by a high tree, standing at an elevation of 678 feet ($206^{m}7$), and there are some more exceptionally high trees about three-quarters of a mile farther northward. Taneh Potta, 304 feet ($92^{m}7$) high, on the coast south-westward of the noticeable square wood, appears from eastward as a bare hill.

Chart 2759a.

Chart 941b.

Tanjong Watoembolo (Watumbolo), 4½ miles west-north-westward of Tanjong Roea, is a rocky point formed by a spur covered with coconut plantations; the wide Kiriwai valley runs far inland eastward of the point. Close westward of the point there is a wide inlet in the coastal reef where landing can be effected; a low rock, covered with vegetation, lies on the coastal reef on the western side of this inlet. Landing can also be effected in a small cove, named Ngèdo, 3 miles west-north-westward of Tanjong Watoembolo, which can be identified by two stone cairns on the coastal reef extending from its eastern entrance point, and at the mouth of the Loku Ngaro, 4 miles farther westward, where there are some huts and no coastal reef; communication with the shore is, however, always difficult on this coast, and in the west monsoon is often quite impossible.

Tanjong Mamba, 8½ miles westward of Tanjong Watoembolo, is the steep extremity of a hilly tongue of land projecting some distance seaward and practically devoid of vegetation; some large rocks lie on the coastal reef extending from the point. Tanjong Rita, 2 miles north-westward of Tanjong Mamba, is a high, wooded point rising steeply from the sea.

A noticeable rock, always above water, lies on the drying reef extending from Tanjong Lingdja, 3 miles west-north-westward of Tanjong Rita, and in the bight westward of the point are two very prominent rocks; the eastern and smaller of the two, named Bahalo, is detached from the coast, whilst the western, named Barégé, is joined to the coast by a reef which dries. At the head of this bight is a low plain, and about 2¾ miles west-north-westward of Tanjong Lingdja there is a noticeable cove, with a rock on the drying coastal reef close eastward of it.

A ridge, with depths of from 3¼ to 6 fathoms (5^{m}9 to 11^{m}0) over it, runs parallel with the coast between the noticeable cove mentioned above and Tanjong Waiboekoe (Waibuku), 4 miles north-westward; vessels should keep fully one mile from the coast here so as to pass outside this ridge, as a heavy, curling sea frequently rises suddenly on it.

Tanjong Waiboekoe is a prominent point rising steeply from the sea to an almost bare, flat part above. Tanjong Mboelir consists of high rocky points with two sandy beaches between them nearly one mile north-westward of Tanjong Waiboekoe, and thence to Tanjong Waiselai, 3 miles farther north-westward, there is a sandy beach along the coast. Loku Belala flows out about midway between these two points, but although fairly wide it is inaccessible; there is a village on the northern bank, near the mouth.

Reede Kodi.—The roadstead for the Kodi district, which is bounded by the coast between Tanjong Waiselai and Tanjong Karosso, lies off Menanga Lokoe (Loku) village, situated at the mouth of a small river close northward of Tanjong Waiselai (*Lat. 9° 37′ S., Long. 119° 00′ E.*). When approaching the roadstead from westward the summit of Wajéwa (page 239), 22 miles east-north-eastward of the roadstead, can be seen as a small half-sphere rising above a long, uniform ridge which descends gradually towards Tanjong Karosso; when nearing the anchorage the low, sandy Tanjong Karosso will be identified, and also the dark wood Atedalo (page 239).

The best anchorage, which is available to vessels with local know-

Chart 2759a.

Chart 941b.

ledge only, is in depths of from 11 to 15 fathoms ($20^{m}1$ to $27^{m}4$), sand, with the southern extremity of the rocky Tanjong Nambaréhé, the northern entrance point of the river, in line with the northernmost house of the village, bearing 065°; on this bearing the southern extremity of Tanjong Nambaréhé appears as a detached rock. Owing to the southerly swell it is inadvisable to anchor closer in. Landing is generally practicable, but attention should be paid to the tidal stream, which runs parallel with the coast with a maximum rate of three-quarters of a knot; the best landing place is at the southern end of the sandy beach fronting the village. Praus can enter the river at high water, but the bar at the mouth is constantly shifting.

STRAAT SOEMBA.—Current.—Straat-Soemba (Sumba), the wide and deep passage northward of Soemba eiland, is little used except by local vessels.

The resultant set of current depends on the monsoon. During April to October the current is west-going, and during December to March, east-going. In the transition month of November the currents are more southerly, generally south-east or south-west. In January, 1932, the yacht *Northern Light* experienced a southerly set of about half a knot from Straat Sape when the vessel was passing through Straat Soemba at a distance of about 22 miles from Kelapa eiland lighthouse (page 233).

Chart 1696.

STRAAT SAPE.—Straat Sape (Sapeh), between the islands Soembawa and Komodo, is the usual route taken by vessels proceeding from Straat Soemba to the Flores sea, and vice versa. The northern part of the strait is divided into two branches by Banta. The main route lies between Sangeang and Banta, but vessels from westward can make use of Straat Sangeang (page 231), thence pass between Sentodo and Barsoe Panda (page 256), and eastward of Kelapa. The passage eastward of Banta and along the Komodo side is seldom used; the depths are very great, the tidal streams are strong, and there is less opportunity of anchoring under the Komodo shore than the Soembawa shore, especially in the west monsoon. The east coast of Soembawa, which forms the western side of Straat Sape, is described on pages 231-234. *See* views facing page 249.

Tidal streams.—The tidal streams in Straat Sape have a semi-diurnal character and are only slightly affected by the monsoon drift in the Flores sea. The tidal streams are weakest about 5 days after the quarters; the maximum rate then averages 3 knots for both the north-going and south-going streams. Very strong tidal streams, with a maximum rate of from 4 to 6 knots, occur from 2 to 5 days after full moon and new moon; when the moon's greatest declination occurs during this period, a rate of from 8 to 10 knots may be expected, although during the west monsoon this only applies to the north-going stream, and during the east monsoon only to the south-going stream.

Near Sentodo (page 232) (*Lat. 8° 33′ S., Long. 119° 11′ E.*), on the western side of the strait, and off Langkoi, on the eastern side of the southern entrance, there are frequently very strong tide-rips and whirlpools, seriously affecting the steering of a vessel. Northward of

Chart 2759a.

Chart 1696.

Langkoi, in the large bight southward of Toro Letoehoh, there is frequently an eddy under the Komodo shore.

During the west monsoon, in the southern part of the strait and between Sentodo and Barsoe Panda, there is a north-going stream from about 4 hours before to one hour after the moon's upper and lower meridian passage; the south-going stream runs for the remainder of the time. In the northern part of the strait the stream turns about one hour later under the Soembawa shore.

During the east monsoon there is a north-going stream throughout the entire strait from about 3½ hours before to 1½ hours after the moon's upper and lower meridian passage; the south-going stream runs during the remaining hours.

Islands and dangers in the fairway.—Anchorages.—Banta, an island lying in the northern part of Straat Sape, is hilly, uninhabited, and mainly covered with reeds; the highest part, in the western half of the island, has a flat summit, 1,307 feet ($398^{m}3$) high, and there are three hills on the north-western peninsula, which are noticeable when seen from westward. The coast is deeply indented by several bays, but from a distance these are not noticeable. *See* view facing page 249.

Only Labuan Gili Banta, on the south coast of Banta, and the small bay westward of Toro Pinoenga (Pinunga), the southern extremity of the island, afford anchorage. Labuan Gili Banta is clear of dangers, but narrows to a width of barely 4 cables towards the head. A rocky islet lies on a projecting point of the reef, which dries, extending about 2 cables offshore on the western side of the entrance, and there is a similar islet on the reef extending about one cable from the eastern entrance point. Two shoal ridges, with a least depth of 2¾ fathoms ($5^{m}0$) over the western, extend about 6 cables southward from the eastern entrance point; there is often a seething sea over these ridges and tide-rips extend a long way out. The depths in the bay decrease from 30 fathoms ($54^{m}9$) at the entrance to 4 fathoms ($7^{m}3$) at the head. Large vessels with local knowledge can find good anchorage on the western side of the bay northward of the islet off the western entrance point where the 10-fathom ($18^{m}3$) line lies about 3 cables offshore.

To enter the small bay westward of Toro Pinoenga, vessels should keep fairly close along that point, bearing in mind that the coastal reef extends about one cable offshore here. Within 2 cables southward of the western entrance point of this bay are two rocks which dry, and about half a mile southward of this point are two rocky islets, the northern of which is 25 feet ($7^{m}6$) high.

Labuan Oi Oengké (Ungke), the large bay on the northern side of the island, is too deep for anchorage. Tandok Rassa (*Lat. 8° 24′ S., Long. 119° 16′ E.*), the western entrance point of the bay, is very steep-to. A reef, with a depth of 4 fathoms ($7^{m}3$) over it, lies 9 cables north-eastward of Toro Oi Oengké (Ungke), the eastern entrance point of the bay.

Barsoe (Barsu) Basso, about 2½ miles south-westward of Toro Pinoenga, consists of a mass of rocks a few feet above water, on which the sea always breaks heavily; shoal water extends about one cable all round them.

Chart 895, plan of Tanjong Wamba to Toro Rano.

Barsoe (Barsu) Menjerih, about 1½ miles southward of Barsoe Basso, is a small pinnacle rock awash; as it is never marked by breakers, and

Charts 941b, 2759a.

Chart 895, plan of Tanjong Wamba to Toro Rana.

there are only tide-rips during the strength of the tidal streams, it constitutes a serious danger. Barsoe (Barsu) Panda, about 1½ miles south-westward of Barsoe Menjerih, is a bare grey rock, 34 feet (10^{m}4) high on the northern and southern sides, and somewhat lower in the middle, bearing some resemblance to a fort; a shoal ridge, with a least depth of 2¾ fathoms (5^{m}0) over it, extends 2¾ cables from the northern side. The depths around are irregular, and a 6-fathom (11^{m}0) patch lies about 6½ cables eastward of the rock. Tukoh Mapinka, 9 cables south-eastward of Barsoe Panda, are two rocks separated by a narrow, shoal channel; they are flat on top, covered with reeds, and are steep-to; a vessel may pass close to them unless the strong tidal streams render this dangerous. Sapekah, about 1¼ miles eastward of Tukoh Mapinka, is the most useful landmark on the eastern side of the main route through Straat Sape; it has the appearance of a wedge, with the low end lying northward, the flat upper side overgrown with reeds, and the bare southern side rising steeply from the sea. A large rock, 20 feet (6^{m}1) high, lies on the reef, which dries, extending a short distance from the north-western side. There are great depths around the islet.

Chart 1696.

Tukoh Gili Banta, about 4½ miles south-eastward of Toro Pinoenga, is a sharp, bare rock rising steeply from the sea; it has three peaks, 197 feet (60^{m}0) high, which are exactly in line when seen from a south-south-westerly direction. About one mile north-north-westward of Tukoh Gili Banta is a small, dangerous rock, usually showing above water except at high water spring tides; the surf on it cannot be distinguished from the usual tide-rips found in Straat Sape. Loeloeh (Luluh) Taré, about 1½ miles south-eastward of Tukoh Gili Banta, is a needle-shaped rock, 69 feet (21^{m}0) high, fringed by a narrow, steep-to reef. Tukoh Seri Kaja, about 1½ miles south-eastward of Loeloeh Taré and about one mile off the western side of Komodo, is a steep islet covered with reeds and 135 feet (41^{m}1) high.

Tukoh Lehok Gebah, about one mile south-westward of Tukoh Seri Kaja and about 9 cables from the western side of Komodo, consists of two islets on a reef, which dries; they much resemble Tukoh Seri Kaja, but are smaller and lower. About one mile westward of Tukoh Lehok Gebah, and near the 100-fathom (182^{m}9) line, is a bank with a depth of 20 fathoms (36^{m}6) over it; the overfalls that mark this spot give it the appearance of a serious danger.

Nisa Léme (*Lat. 8° 37′ S., Long. 119° 21′ E.*), about 4 miles south-south-westward of Tukoh Lehok Gebah and about 1¾ miles off the western side of Komodo, is a steep, rugged rock, 131 feet (39^{m}9) high, and it can be passed close to.

Directions.—Vessels from southward should enter Straat Sape with the eastern extremity of Kelapa (page 233) bearing less than 360°; thence pass eastward of that island, and bring the light-structures on it in line astern, bearing 172°, which leads between Mata Gateh and Sentodo on the west, and Tukoh Mapinka and Basoe Panda on the east.

Charts 3756, 1696.

Komodo.—Komodo, on the eastern side of Straat Sape, is a mountainous island almost entirely covered with jungle; it is practically uninhabited, the only village being Komodo on the east coast, and the few inhabitants live by fishing and hunting deer. A ridge of moun-

Charts 941b, 2759a.

Charts 3756, 1696.

tains, named Batoe Montjo (Batu Moncho), extends along the north coast of the island, but there are no distinctive peaks anywhere that could be used for navigational purposes by vessels passing northward or southward of the island.

A peculiar creature, sometimes called the " Komodo dragon " owing to its resemblance to that legendary monster, is found in the forests of Komodo and also on the neighbouring island of Rindja ; these beasts possess colossal strength, attain a length of about 10 feet (3^{m}0), and attack the numerous wild horses on the island, and sometimes even men.

Chart 3756.

Western side of Komodo.—The west coast of Komodo, forming the eastern side of Straat Sape, is of no importance to general shipping, but the following brief description may be useful to vessels desiring to anchor in any of the bays.

Telok Batoe Montjo (Batu Moncho) is entered between Toro Batoe Montjo (Batu Moncho), the north-western extremity of Komodo, and a point about 2 miles north-eastward. The depths between the 20- and 30-fathom (36^{m}6 and 54^{m}9) lines are fairly regular, over sand ; the 20-fathom (36^{m}6) line lies from one to 3 cables offshore. The greater part of the shore of the bay consists of a sandy beach fringed by a narrow reef. Toro Batoe Montjo is a steep, wooded point ; two bare rocks lie on the coastal reef extending from it.

Lehok Boko is entered between a point about 2 miles southward of Toro Batoe Montjo and Toro Lehok Boi, about 2 miles farther south-westward ; it is constricted at the head by a reef, which dries, with a large rock on it, extending about 2 cables from the northern shore. A rock, on which the sea breaks heavily, lies on the extremity of the reef extending about one cable from the northern entrance point of the bay. Large vessels should anchor in depths of from 10 to 14 fathoms (18^{m}3 to 25^{m}6) close westward of the point on the southern side of the inner part of the bay, about 1¾ miles east-north-eastward of Toro Lehok Boi (*Lat. 8° 30′ S., Long. 119° 25′ E.*) ; this point may be identified by its bare, flat, steep outer part.

Toro Lehok Boi, about 3½ miles southward of Toro Batoe Montjo, is the extremity of a high tongue of land separating Lehok Boko and Lehok Boi. Tukoh Lehok Boi, consisting of two rocky islets covered with vegetation, the larger of which is 69 feet (21^{m}0) high, and some rocks above water, all connected by a reef, which dries, lies in the middle of the entrance to Lehok Boi, and 9 cables southward of Toro Lehok Boi. The head of the bay is divided into two parts by a projecting point ; the best anchorage is in the southern part, outside the 10-fathom (18^{m}3) line. Entering the bay vessels can pass either northward or southward of Tukoh Lehok Boi, giving the drying reef a berth of about 2 cables ; care should be taken to avoid a ridge, with a least depth of 4 fathoms (7^{m}3) over it, extending about 2½ cables from the point at the head of the bay.

Chart 1696.

Telok Ladjoe (Laju)Pamalé, about 3¼ miles south-south-westward of Toro Lehok Boi, affords anchorage fairly close to the reef fringing its shores. An islet, 197 feet (60^{m}0) high with its upper part covered with vegetation and having very steep sides, except on the north-eastern side, lies on the reef extending 5 cables north-north-westward from the

Charts 941b, 2759a.

Chart 1696.

south-western entrance point of the bay; there is a deep channel clear of dangers between this islet and Tukoh Seri Kaja (page 256). A steep-to rock, which is awash, but seldom breaks, lies about 9 cables south-westward of the southern extremity of this islet and about 3 cables from the western coast of Komodo.

Tanjong Saloka (*Lat. 8° 35′ S., Long. 119° 23′ E.*) and Toro Letoehoh (Letuhoh), 2 and 4½ miles south-south-westward of the south-western entrance point of Telok Ladjoe Pamalé, respectively, are high, steep points; Toro Letoehoh has the form of a sugarloaf when seen from northward or southward, and a flat rock above water, on which the sea always breaks heavily, lies on the extremity of the reef, which dries, extending about 3 cables southward from the point.

Labuan Letoehoh (Letuhoh) lies eastward of Toro Letoehoh, and is the only serviceable anchorage on the west coast of Komodo, southward of Telok Ladjoe Pamalé. A steep, rocky islet, covered with vegetation, lies on the wide bank extending about 4 cables northward from the eastern entrance point of the bay. There is a sandy beach at the head of the bay.

Southward of Labuan Letoehoh the coast is high and very steep-to, without any dangers. Labuan Langkoi, immediately northward of the south-western extremity of Komodo, is too deep to afford anchorage; a rock, usually above water and always marked by surf, lies in the middle of the bay.

Langkoi, close off the south-western extremity of Komodo, to which it is connected by a reef, is a steep, bare islet, rising to a narrow, very prominent ridge, and is a good landmark for vessels approaching Straat Sape from southward. Rocks above water extend 2 cables southward from Langkoi. *See* view facing page 249.

Chart 3756.

Northern side of Komodo.—The north coast of Komodo is uninhabited, and tolerably high mountains rise close within it; except for the peninsula at the north-western end, however, there are no summits that afford useful marks for navigation.

Telok Gili Lawa, which extends nearly along the entire north coast of Komodo, is separated from Telok Batoe Montjo (page 257) by a high tongue of land. The shores of the bay are bare and steep, with occasional sandy beaches. The southern shore forms three small bays; a reef, with two bare rocks, on it extends nearly 3 cables eastward from the western entrance point of the western bay. The middle bay has a white sandy beach and affords good anchorage, in depths of 22 to 25 fathoms ($40^{m}2$ to $45^{m}7$), sand, with the southern extremity of Gili Lawa Darat in line with the eastern entrance point of the bay, bearing about 080°. A detached rock, which is easily identified, lies on the reef, which dries, extending from the western entrance point of the middle bay. The eastern entrance point somewhat resembles an elephant's back.

Off-lying islets and dangers.—Gili Lawa Darat and Gili Lawa Laoet (Laut), forming the eastern side of Telok Gili Lawa, are two islets almost entirely covered with vegetation. The western part of Gili Lawa Darat consists of a plateau, 659 feet ($200^{m}9$) high, and there are several lower hills northward; the eastern part of Gili Lawa Laoet has two peaks of nearly equal elevation, and there are several lower hills with sharp summits in the western part.

Charts 941b, 2759a.

A rock awash lies about half a mile northward of the north-western extremity of Gili Lawa Laoet, and a rock, with a depth of 1¾ fathoms (3^{m}2) over it, lies 9 cables northward of the same point.

Toko Toko (*Lat. 8° 25′ S., Long. 119° 34′ E.*), about 2 miles northward of Gili Lawa Laoet, is an islet sparsely covered with vegetation, having three small peaks, the middle one being 84 feet (25^{m}6) high.

STRAAT LINTA.—Straat Linta is bounded on the western side by the east coast of Komodo, and on the eastern side by the northern part of the west coast of Flores and by Rindja. Owing to the numerous islets in the northern part of the strait, which make the route somewhat tortuous, and the strong tidal streams, Straat Linta is seldom used. *See* view facing page 249.

Tidal streams.—Little is known of the tidal streams in Straat Linta, and the extent to which they are affected by the monsoons has not been determined; the following particulars may be useful:—

The tidal streams divide into two parts northward of the islets, one part setting westward along the north coast of Komodo, and the other eastward along the north coast of Flores. The numerous islets lying in the northern part of the strait considerably affect the general direction of the stream, thus causing whirlpools, eddies, and tide-rips northward of Rindja.

The rate of the tidal streams is considerable. In the western part, along the east coast of Komodo, a maximum rate of 6 knots was observed during both the north-going and south-going streams; a rate of 9 knots was observed just southward of the narrows between Padar and Rindja.

Very little information can be given about the changes in the tidal stream; in the narrows between Padar and Rindja a south-going stream, with a rate of 4 knots, was observed to change to a north-going stream, with the same rate, in the short period of half an hour. It was also observed that, when the south-going stream was running strongly westward of Padar, there was a strong eddy northward through Lehok Karbau, eastward of Padar.

Western channel.—Islands and dangers.—The western channel into Straat Linta from northward is bounded on the west by the northern part of the east coast of Komodo, and on the east by the islands of Tatawa and Siaba besar (page 260).

The east coast of Komodo, between its north-eastern extremity and Toro Koening (Kuning), about 6½ miles southward, is generally steep, fringed by a wide reef and fronted by several rocky islets and reefs. Boegies (Bugies) eilanden lie close off the north-eastern extremity of Komodo; both have sharp summits and are covered with reeds. There is a clear channel between these two islets, and also between the western islet and the reef extending from the Komodo coast, but strong tidal streams run through them. For about one mile southward of the north-eastern extremity of Komodo the coast is rocky with occasional sandy beaches, but thence to Toro Koening it assumes a different character, being covered with mangroves except for a few small rocky parts; the mountains rise close behind. Toro Koening is a sharp, rocky point formed by a spur sloping down gradually from the mountains behind. About 2 miles west-north-westward of Toro Koening is a peculiar hill, 1,038 feet (316^{m}4) high, the summit of which consists of several sharp crests. Three rocks above water lie on a small reef, which dries, about half a mile south-eastward of Toro Koening (*Lat. 8° 36′ S., Long. 119° 35′ E.*). The description of the east coast of Komodo southward of Toro Koening is continued below.

Sabita, an island, with a prominent summit 507 feet ($154^{m}5$) high and covered with reeds, lies on the coastal reef 3 miles southward of the north-eastern extremity of Komodo; there is a steep rock close south-westward of Sabita. Makasser rif lies 6 cables off the coast between Sabita and Boegies eilanden, and dries over its whole extent; Gili Makasser, a low islet covered with mangroves and noticeable owing to its light-green colour, lies on the northern part of this reef. Tamboenan (Tambunan) Singkala, a raised bank of sand and coral on the eastern part of a reef, which dries, 3¼ cables south-south-eastward of Makasser rif, is sometimes inhabited temporarily by natives hunting deer on Komodo. Southward of Tamboenan Singkala, and separated from it by a narrow channel, is another large reef, which dries; there are several reefs between this latter reef and the Komodo coast.

A small rock, fringed by a reef, which dries, lies 1¼ miles eastward of the northern extremity of Tamboenan Singkala; about 1¼ miles south-south-westward of this rock, and about half a mile off the eastern side of the large drying reef southward of Tamboenan Singkala, is a dangerous reef, with a depth of 1¼ fathoms ($2^{m}3$) over it, only visible by discoloration at a very short distance.

Tatawa, 2¾ miles eastward of Gili Makasser, is steep on its northern and western sides, whilst the southern part is low, marshy in parts, and covered with reeds; a reef, which dries, extends about 3 cables from the southern side. A rock in the form of a sugarloaf, 89 feet ($27^{m}1$) high, lies three-quarters of a mile south-westward of Tatawa.

Siaba besar, separated from Tatawa by a deep channel three-quarters of a mile wide, has a long, narrow ridge running in a north and south direction, rising to an elevation of 448 feet ($136^{m}6$) at the northern end, and connected by a saddle to another summit at the north-eastern end of the island; the fringing reef extends about half a mile from the northern side. Siaba kechil, off the western side of Siaba besar, has three small summits about 148 feet ($45^{m}1$) high and is covered with reeds and shrubs. Maoean (Mauan), about one mile westward of the southern part of Siaba besar, is also covered with reeds and shrubs and has three summits, the highest, which has an elevation of 123 feet ($37^{m}5$), being on the north-western extremity; it is fringed by a reef, which dries, and a bank, with depths of less than 10 fathoms ($18^{m}3$) over it, extends half a mile southward and south-eastward from the island.

The Komodo coast between Toro Koening (page 259) and Toro Lia, nearly 3½ miles westward, is steep, rocky, and fringed by a reef extending about 4 cables offshore in places. Poenja (Punya) is an islet, separated from Toro Lia by a narrow channel having a coral reef, with a depth of 1½ fathoms ($2^{m}7$) in its western part; the highest part of the islet, near the south-western end, has an elevation of 180 feet ($54^{m}9$). Lawa is an islet lying close off the south-western side of Poenja, and there is another small islet off its south-eastern end; a reef, with two rocks awash on it, lies 2½ cables off the eastern side of Poenja. A rocky islet, 73 feet ($22^{m}3$) high, lies 4 cables southward of

Poenja, and is separated from it by a channel clear of dangers, with depths of from about 20 to 27 fathoms ($36^{m}6$ to $49^{m}4$). Good anchorage can be obtained off the coast between Toro Koening and Poenja.

Telok Slawi, entered between Toro Lia (*Lat. 8° 36′ S., Long. 119° 31′ E.*) and Toro Lawi, about 1½ miles south-westward, is described under Anchorages, on page 262.

Padar, an island, with its northern extremity about 2½ miles south-eastward of Toro Koening, is mainly covered with reeds, and has three prominent peaks; two of these, in the south-western part of the island, are rugged, and the other one, in the form of a pyramid, is situated in the south-eastern part. The southern extremity of the island is the termination of a long, narrow, high tongue of land; a rocky islet lies close eastward of this point, and Pilaar steen (Pillar rock), which is very prominent, lies close off the southern side of this islet. Several rocks lie on the coastal reef around Padar, the most noticeable being Cubus steen (Cube rock), about 3 miles north-eastward of Pilaar steen.

Padar kechil, about 6 cables off the south-western side of Padar, is 423 feet ($128^{m}9$) high, somewhat conical in form and is scantily covered with vegetation. A steep-to reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies about 3 cables eastward of this islet. Sarang, about three-quarters of a mile south-westward of Padar kechil, is a rock 94 feet ($28^{m}7$) high, and there are several small rocks on the drying reef which fringes it; one on the southern side is not always marked by breakers and never by discoloration.

Pajoeng (Payung), in about the middle of the passage between Padar and the western side of Rindja, rises steeply from the sea on all sides to an elevation of 118 feet ($36^{m}0$), and is of a whitish colour with some vegetation on the summit; a rock above water lies close off the northern extremity of Pajoeng.

The northern part of the west coast of Rindja is mainly overgrown with reeds, whilst the southern part is occupied by wooded hills with no noticeable summits. Toro Nggikok, the north-western extremity of Rindja, is steep. Sarai, about one mile southward of this point, is a hilly islet covered with reeds and shrubs and of a whitish yellow colour; it is joined to the coast by a narrow reef, which dries. Close south-eastward of Sarai is a rocky islet on a reef, which dries, on which are several rocks above water; a detached 1½-fathom ($2^{m}7$) patch lies about one cable westward of the southern rock.

Lehok Karbau, the bight southward of Sarai, has hilly shores of a light yellow colour rising steeply from the sea, with narrow sandy beaches between the points; several isolated trees stand on the reed-covered slopes of the hills. A rocky islet of a bright red colour lies on the reef, which dries, extending about 1¾ cables from the northern entrance point of the bight, and there is a rock above water close northward and southward of it.

Lehok Ginggo (Gingo) is separated from Lehok Karbau by a narrow tongue of land terminating in Toro Gongge (Lehok Karbau); the shores of this bay are indented by many small creeks, and some islets and rocks lie in the northern part. Toro Mbarata, the southern entrance point of the bay, is situated about 1½ miles southward of Toro Gongge, and is of a reddish colour. A rock awash lies half a mile westward of Toro Mbarata; Kubus steen, off the east coast of Padar, open

Chart 3756.

eastward of the north-east point of that island, bearing 003°, leads about 4 cables westward of this danger.

There are several bays, with steep shores and only suitable for small vessels, southward of Toro Mbarata. Toro Propa (Lehok Banda), about 1½ miles south-south-westward of Toro Mbarata, is a light green colour and lower than Toro Mbarata; a rock awash not marked by discoloration but which sometimes breaks, lies about one cable north-westward of Toro Propa, and a similar rock lies about 2½ cables west-south-westward of the same point. A rock, with a depth of 3½ fathoms ($6^{m}4$) over it, lies 9 cables south-westward of Toro Propa. Between Toro Natoe, about 9 cables southward of Toro Propa, and Toro Taä, about 3 miles south-south-eastward, the land is high and thickly wooded.

Two rocks above water and a number of rocks awash lie off Toro Taä (*Lat. 8° 48′ S., Long. 119° 38′ E.*).

Western side of southern end of Straat Linta.—Between Toro Lawi and the south-eastern extremity of Komodo the coast forms several bights, including Telok Logo and Lehok Séra, and is generally fringed by a narrow reef. An islet, in the shape of a sugarloaf and 315 feet ($96^{m}0$) high, lies about 7 cables offshore and 2 miles southward of Toro Lawi. Logo, an islet 344 feet ($104^{m}8$) high, lies about 2½ miles south-south-westward of this islet and 9 cables offshore, and is noticeable owing to the clear white rocky patch on its north-eastern side; a rocky patch on a reef, which dries, lies between Logo and the coast south-westward.

The south-eastern extremity of Komodo is a long, narrow, high tongue of land rising steeply from the sea; except from eastward it can be identified by a hill on it, 822 feet ($250^{m}6$) high. A steep, bare rock, 192 feet ($58^{m}5$) high, lies half a mile eastward of the point; a reef extends about one cable from the eastern and western sides of this rock, and a rock above water lies on the reef extending from the eastern side. There is a channel clear of dangers between the south-eastern extremity of Komodo and the rock.

Charts 3756, 1696.

The south coast of Komodo, generally named Toro Langkoi, rises almost everywhere steeply from the sea, which breaks with great violence on it, especially in the South-east monsoon. Except in two places near the eastern end there is no coastal reef, but a few rocks lie close under the coast. An island, 980 feet ($298^{m}7$) high, covered with light-coloured vegetation, and steep except on its northern side, lies about 2¾ cables off the middle of this coast; there is a small bay with a white sandy beach on the southern side of the island, and a rock above water lies off the western entrance point. A rock awash lies close off the northern extremity of the island. Four steep rocks, scantily covered with vegetation, lie about three-quarters of a mile west-north-westward of the northern extremity of the island and about half a mile off the southern side of Komodo, and there are several rocks awash around them; good anchorage can be obtained in a depth of 24 fathoms ($43^{m}9$), black sand and coral, in the basin formed between these rocks, the island, and the coast of Komodo.

Anchorages in the western channel of Straat Linta.—Telok Slawi, on the eastern side of Komodo, has two deep bights in it, named Soro Lia and Soro Go, on the northern and south-western sides, respect-

Charts 941b, 2759a.

Charts 3756, 1696.

ively. There is a sandy beach at the head of Soro Lia and also at Komodo village, on the western side; elsewhere the shore of this bight is rocky. A small coral reef, with a depth of 4 feet (1^{m}2) over it, lies about 2¾ cables off the eastern shore of Soro Lia and 7 cables northward of Toro Lia. Lassa, an islet, with a noticeable tree in the middle and about 100 feet (30^{m}5) high, lies midway between the two bights and is fringed by a narrow reef. An islet lies on a projecting part of the coastal reef extending about 3 cables offshore westward of Lassa (*Lat. 8° 36′ S., Long. 119° 30′ E.*). The shores of Soro Go are covered with mangroves, and in a few places spurs from the mountains descend to the sea. An islet lies nearly in the middle of this bight; the fringing reef extends about 2½ cables from its eastern side and there is a rock on its extremity. There is an islet on the reef extending from the western side of Toro Lawi. When entering Telok Slawi attention should be paid to the tidal streams, which set across the entrance. There is very good anchorage off Komodo; the inhabitants of this small village live chiefly by hunting and fishing.

Anchorage can also be obtained in Telok Logo and Lehok Séra, southward of Telok Slawi.

The best anchorage on the western side of Rindja is in Lehok Ginggo where the tidal streams are not felt.

There is good anchorage, free from the influence of the tidal streams, in the large bay on the south-eastern side of Padar. Anchorage can also be obtained off the north-west coast of this island, where there is a bay entirely filled by the coastal reef.

Directions for the western channel.—Approaching the western channel from northward the three prominent summits of Padar (*see* page 261) are visible; a vessel should steer for the pyramid summit, bearing 194°, which leads between the two rocks south-westward of Tatawa, and thence between Maoean and the dangerous 1¼-fathom (2^{m}3) reef lying 1¼ miles westward of that island; the western extremity of Tatawa in line astern with the eastern of the two above-mentioned rocks, bearing 021°, astern, also leads between Maoean and the 1¼-fathom (2^{m}3) reef. When the southern extremity of Siaba besar is in line with Mandjaga (Manjaga), on the west coast of Flores, bearing 089°, the vessel will have passed the 1¼-fathom (2^{m}3) reef and also the shoal water southward of Maoean, and she can then steer a mid-channel course through the narrows between Toro Koening and the north-western extremity of Rindja and thence through the southern part of Straat Linta.

Eastern channel.—Islands and dangers.—The eastern channel into Straat Linta, from northward lies between a number of islets and reefs lying off the northern part of the west coast of Flores and off the north coast of Rindja, and then leads southward of Siaba besar to the narrows between Toro Koening and the north-western extremity of Rindja. The following is a brief description of the islets and reefs bordering the eastern channel:—

Chart 3756.

Sabajor (Sabayor) besar lies with its southern extremity about 4¼ miles eastward of Tatawa (page 260); it is devoid of trees and covered with reeds, and has a sharp, prominent summit; a reef, with a depth of 3 fathoms (5^{m}5) over it, lies about 6 cables northward of the northern side of this island. Sabajor (Sabayor) kechil, close westward

Charts 941b, 2759a.

Chart 3756.

of the southern part of Sabajor besar, has several summits from about 150 to 200 feet ($45^{m}7$ to $61^{m}0$) high, and is overgrown with shrubs; the channel between these two islands is too narrow, and the tidal streams are too strong, for navigation. A number of islets and reefs lie within 2 miles south-eastward of Sabajor besar; of these Misa, about 100 feet ($30^{m}5$) high in the northern part, is inhabited. Kanawa (*Lat. 8° 30′ S., Long. 119° 46′ E.*), about 1¼ miles eastward of Sabajor besar, has a plateau, covered with reeds and is 300 feet ($91^{m}4$) high in the northern part; the north coast of the island is rocky; the southern half of the island consists of a low plain covered with shrubs and fringed by a sandy beach, whilst a few huts stand on the south-western side. A rock, bearing some resemblance to a lion, lies on the reef, which dries, extending 3 cables from the northern side of Kanawa, and a narrow reef, with a least depth of 1¾ fathoms ($3^{m}2$) over it, lies close outside the coastal reef here; reefs extend for 2 miles southward of the island.

Poengoe (Pungu) besar and Poengoe (Pungu) kechil lie together on a reef, which dries, about 2¼ miles south-eastward of Kanawa. Poengoe besar has two summits, the north-eastern being the higher, and is noticeable owing to its steep, rugged, whitish-yellow north-western coast; there are a few huts near the south coast, and two islets lie on the coastal reef here. Poengoe kechil also has two summits, but is marshy elsewhere.

A stone and coral reef, with a least depth of 1¾ fathoms ($3^{m}2$) over it, lies 3½ miles northward of Poengoe kechil; a reef with a least depth of 1¾ fathoms ($3^{m}2$) over it, lies midway between this reef and Poengoe kechil. A shoal, with a depth of 6 fathoms ($11^{m}0$) over it, lies about three-quarters of a mile westward of Poengoe besar.

Bangkau and Koekoesan (Kukusan) lie together on a reef, which dries, nearly one mile southward of Poengoe besar. Bangkau has a hill on it about 70 feet ($21^{m}3$) high, and is marshy elsewhere; Koekoesan, 374 feet ($114^{m}0$) high, is thickly covered with shrubs and is in the form of a sugarloaf. A detached reef lies about a quarter of a mile northward of the northern extremity of Bangkau and close off the reef extending from that islet.

Papagaran besar and Papagaran kechil each lie on a reef which dries, and which is marked by discoloration west-south-westward of Bangkau (*Lat. 8° 33′ S., Long. 119° 47′ E.*). A hilly ridge, rising to an elevation of 423 feet ($128^{m}9$), runs in an east and west direction through Papagaran besar; the eastern part is marshy. There is a small village on the west coast, and an inlet in the coastal reef here affords good shelter for praus. Papagaran kechil, one mile eastward of Papagaran besar, is mainly marshy, except on the northern side, where it rises slightly.

Tengah besar and Tengah kechil lie on a reef, which dries, close westward of Papagaran besar. Tengah besar is rocky on the western side, where it rises to a conical summit, 458 feet ($139^{m}6$) high; Tengah kechil, close southward of Tengah besar, is much lower. A rock above water lies about a quarter of a mile westward of Tengah besar.

Mengjatan (Mengyatan), about 2¼ miles south-westward of Sabajor besar, has a plateau, 394 feet ($120^{m}1$) high in the western part and is partly bare and partly covered with reeds; the western side of this island is steep-to, but a reef, which dries, extends 3 cables from its north-eastern side, prolonged by a bank, with a depth of 2½ fathoms ($4^{m}6$) over its outer end, about 1¼ miles offshore.

Charts 1696, 941b, 2759a.

Chart 3756.

Seraja (Seraya) eilanden lie close northward of Toro Wadoe (Wadu) Ramba, the north-western extremity of Flores, situated about 7 miles north-eastward of Kanawa. Seraja (Seraya) besar, the northern of the group, has three summits, the middle one, near the western side of the island, being the highest. The coast of this island is generally steep and rocky, with occasional small sandy beaches; a small village is situated on the south-western side of the island, where there is a flat part planted with coconut trees. The fringing reef is very steep-to and shoals, with a least depth of 1½ fathoms (2^{m}7) over them, lie within one mile of the north-eastern extremity; the north-western extremity of Sabolan besar in line with the north-western extremity of Seraja besar, bearing 246°, leads north-westward of these dangers. Seraja (Seraya) kechil is low and is fringed by a steep-to reef, which dries. South-westward of Seraja besar and westward of Seraja kechil there is a large area, with depths of from 19 to 30 fathoms (34^{m}7 to 54^{m}9), mud and sand, affording good anchorage, sheltered during the South-east monsoon.

Sabolan eilanden lie westward of Seraja besar, and are separated from it by a deep passage clear of dangers, 1½ miles wide. Sabolan besar has two summits, which form a saddle when seen from a north-easterly or south-westerly direction; the islet is covered with brushwood and has rocky coasts, except at the south-east point, where there is a sandy beach and a single hut. Sabolan kechil is thickly covered with shrubs and rises steeply from the sea. Each islet is fringed by a very narrow, steep-to reef.

Toro Wadoe Ramba (*Lat. 8° 26′ S., Long. 119° 52′ E.*) is the steep, rounded, north-western extremity of a hilly peninsula showing two summits from an easterly and westerly direction. One mile south-westward of this point is a bare, dark rock, 79 feet (24^{m}1) high, resembling a lion lying down with its head westward; a reef, with a least depth of 2½ fathoms (4^{m}6) over it, lies one mile west-south-westward of this rock. The lion-shaped rock in line with the 709-foot (216^{m}1) summit on the peninsula of Toro Wadoe Ramba, bearing 084°, leads about half a mile northward of the 1¾-fathom (3^{m}2) reef lying 3½ miles northward of Poengoe kechil, mentioned on page 264.

Charts 895, plan of Labuan Bajo, 3756.

Koekoesan (Kukusan) is an islet lying on the coastal reef 2¼ miles southward of Toro Wadoe Ramba, and has a sharp summit, 521 feet (158^{m}8) high, in the form of a sugarloaf; owing to its dark colour it stands out plainly against the land behind. A shoal, with a depth of 3¼ fathoms (5^{m}9) over it, lies in the bight 2½ cables northward of Koekoesan. Another islet lies between Koekoesan and the coast. A conspicuous, conical hill, 192 feet (58^{m}5) high, lies close to the coast 8¾ cables south-eastward of Koekoesan. A rocky islet, fringed by a reef, lies about 2½ cables southward of Koekoesan.

Tebolon, an island covered with reeds, lies about 1½ miles west-south-westward of Koekoesan; there are a few dwellings and a coconut plantation on the southern side of the island. A reef, with a least depth of 2¼ fathoms (4^{m}1) over it, lies about half a mile north-eastward of Tebolon, and a reef, with a depth of 4¾ fathoms (8^{m}7) over it, lies about 3 cables east-north-eastward of the same island; the conspicuous conical hill near the coast south-eastward of Koekoesan bearing about 103°, just open northward of the rocky islet southward of Koekoesan, leads northward of these reefs.

Charts 1696, 941b, 2759a.

Charts 895, plan of Labuan Bajo, 3756.

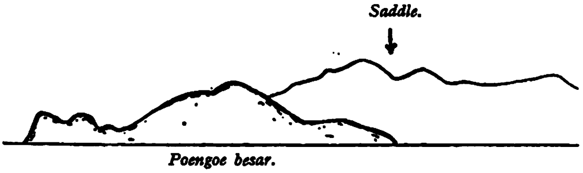
Kokotoan, Tenga, Badjo (Bajo) and Salama, with several rocks above water, lie on a reef which dries, separated by a narrow channel from a low sandy point formed by the coast nearly 1½ miles south-south-eastward of Koekoesan. Kokotoan, 295 feet ($89^{m}9$) high, is separated from Tebolon by a passage encumbered with two low rocks, and which is not navigable. A rock awash lies about one cable southward of the steep southern extremity of this island. There are three hills on Tenga, and there is a noticeable yellow stripe on the northern and eastern of these. Badjo is 320 feet ($97^{m}5$) high on its northern side, and there is a village on the eastern side. Three reefs, the middle one of which partly dries, lie about 2 cables off the north coast of Badjo ; a 2½-fathom ($4^{m}6$) patch lies about 3½ cables westward of the conspicuous conical hill. Salama, also named Soenoe (Sunu), is steep, except its northern extremity, which is covered with mangroves.

A reef, which dries, on which is a rock above water, lies about 3 cables southward of Tenga, and another reef, which dries, lies between this reef and Salama. Two reefs, each having a depth of 3¼ fathoms ($5^{m}9$) over it, lie about one mile south-westward and south-south-westward, respectively, of Kokotoan. For Labuan Badjo, *see* page 267.

Chart 3756.

Batu Poetih (Putih), on the Flores coast about 2¾ miles southward of Kokotoan, is a very prominent, steep, white point, 246 feet ($75^{m}0$) high, with a white sandy beach on either side. Mandjaga (Manjaga), an islet which from westward and north-westward only appears as a high point of the land, lies on the coastal reef about one mile west-south-westward of Batu Poetih. Two shoals, with depths of 2 and 1¼ fathoms ($3^{m}7$ and $2^{m}3$) over them, respectively, lie about 3 cables north-westward and 4 cables west-north-westward of Mandjaga, which is a prominent conical mountain, 1,206 feet ($367^{m}6$) high, near the coast about 1¼ miles southward of Mandjaga eilandje. The west coast of Flores southward of Mandjaga eilandje is described with Straat Molo on page 270.

Directions for the eastern channel.—A vessel from northward should approach the eastern channel of Straat Linta, with Mandjaga berg in line with the saddle of Poengoe kechil, bearing 145°, which leads between Kanawa and the shoals north-eastward of it. When the south-western peak of Gili Lawa Laoet (*Lat. 8° 27′ S., Long. 119° 35′ E.*) is in line with the southern extremity of Kanawa, bearing 285°, she should alter course southward and pass westward of Poengoe besar, avoiding the 6-fathom ($11^{m}0$) shoal nearly in mid-channel westward of Poengoe eilanden, and a bank, with a depth of 2¾ fathoms ($5^{m}0$) over



Saddle on Flores in line with the south-eastern extremity of Poengoe besar, bearing 070°.

(*Original dated* 1931.)

Charts 1696, 941b, 2759a.

Chart 3756.

it, extending about 2½ cables westward from the south-western extremity of Poengoe besar. When the south-eastern extremity of Poengoe besar is in line with a saddle of the mountains near the north coast of Flores, bearing 070°, she should keep this alignment on astern, which leads northward of Papagaran besar and Tengah besar to the narrows between Toro Koening and Toro Nggikok, the north-western extremity of Rindja.

A vessel proceeding through the eastern channel in the reverse direction should keep the south-eastern extremity of Poengoe besar in line with Flores saddle until the southern extremity of Koekoesan is in line with the northern extremity of Bangkau, bearing 109°, when a north-north-easterly course may be steered.

Middle channel.—Directions.—The middle channel into Straat Linta from northward lies between Siaba besar (page 260) and Mengjatan (page 264); it is free from danger and can be easily navigated by eye, steering a southerly course to pass between these two islands. When the south-eastern extremity of Poengoe besar is in line with Flores saddle, bearing 070°, the vessel should keep this alignment on astern, which will lead northward of the rocks off the northern coast of Rindja to the narrows.

Chart 895, plan of Labuan Bajo.

Labuan Badjo.—Light.—Dangers.—Labuan Badjo (Bajo), the name given to the southern part of the channel between Badjo (page 266) and the west coast of Flores, affords good but confined anchorage, in depths of from 9 to 10 fathoms ($16^{m}5$ to $18^{m}3$), mud, and the rate of the tidal streams never exceeds half a knot. The roadstead is free from dangers but there are several shoals in the approaches. A 2¼-fathom ($4^{m}1$) patch lies in the northern entrance about three-quarters of a cable north-eastward of the north-eastern extremity of Badjo, reducing the navigable channel to a width of barely half a cable. In the southern approach are the following dangers:—a coral patch, with a depth of 2 fathoms ($3^{m}7$) over it, and seldom marked by discoloration, lies about 7 cables southward of the low sandy point on the eastern side of Labuan Badjo and less than one cable eastward of the leading line; a rock, which dries, lies about 2 cables east-south-eastward of this patch; a reef, with a depth of 2 fathoms ($3^{m}7$) over it, and seldom marked by discoloration, lies about half a mile southward of the low sandy point, and a rock, with a depth of 3 feet ($0^{m}9$) over it, lies about one cable southward of the same point.

Badjo (Bajo) village (*Lat. 8° 29′ S., Long. 119° 53′ E.*), situated on the Flores shore, although small is of some importance as a place of export. There is a flagstaff on the beach, but it is difficult to identify unless a flag is displayed from it; near the flagstaff is a pier for boats. Northward of the village is a noticeable white tomb.

A light is occasionally exhibited, at an elevation of 20 feet ($6^{m}1$), on the head of the pier. Provisions, except fish, bananas, etc., are difficult to obtain, and no water is available. Labuan Badjo is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Charts 895, plan of Labuan Bajo, 3756.

Directions.—Vessels bound for Labuan Badjo from northward usually pass westward of Sabolan eilanden and westward of Tebolon. Vessels from north-eastward will find the clearing mark for the shoals

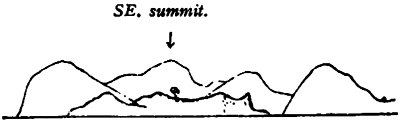
Charts 1696, 941b, 2759a.

Charts 895, plan of Labuan Bajo, 3756.

off the north-eastern extremity of Seraja besar, given on page 265, useful when approaching that island.

When westward of Sabolan eilanden a vessel should steer for Batu Poetih bearing 159°, until Koekoesan is in line with the northern of the two rocks between Tebolon and Kokotoan, bearing about 055°, when she should steer for the northern end of the steep part of the coast close southward of Padé village, bearing 112°. When Badjo village can be seen between Badjo and Salama she should steer for the northern end of a steep part of coast about half a mile southward of Badjo village bearing 091°; as soon as Salama has been passed the roadstead may be entered by keeping the conspicuous 192-foot (58$^{\mathrm{m}}$5) hill on the coast northward of Badjo village in line with the low sandy point by that village, bearing 021°. Another alignment for entering the roadstead is the steep part of the shore of the bay northward of Badjo in line with the low sandy point, bearing 024°.

A vessel approaching from westward should keep the 709-foot (216$^{\mathrm{m}}$1) summit of Toro Wadoe Ramba in line with the lion-shaped rock westward, bearing 084°, which leads northward of the reefs lying northward of Poengoe eilanden; when Batu Poetih bears 159°, she should steer for it on that bearing and follow the directions given above for a vessel approaching from northward. The vessel may pass between the reefs lying northward of Poengoe eilanden by keeping the south-eastern summit of Tenga in line with an isolated tree in the middle of Tebolon, bearing 103°.



SE. summit of Tenga in line with an isolated tree in the middle of Tebolon, bearing 103°.

(*Original dated* 1931.)

Vessels bound for Labuan Badjo from Straat Linta can follow the directions for the eastern channel given on page 266, and then steer with the south-western summit of Gili Lawa Laoet in line with the southern extremity of Kanawa, bearing 285° astern, which leads between Poengoe kechil (*Lat. 8° 31′ S., Long. 119° 48′ E.*) and the reefs northward of that island; on this alignment the southern of two rocks lying on the reef extending from the northern side of Sabajor besar is just open southward of Kanawa. Vessels can proceed on this alignment southward of the two 3½-fathom (5$^{\mathrm{m}}$9) reefs about one mile south-westward of Kokotoan, or they can pass northward of them.

Chart 3756.

RINDJA.—Rindja (Rinja) is a mountainous island, densely wooded almost throughout. Doro Ora, in the southern part of the island, 2,190 feet (667$^{\mathrm{m}}$5) high, is the highest peak, but is difficult to identify; Doro Radja (Raja), in the north-eastern part, is 1,151 feet (350$^{\mathrm{m}}$8) high, and very prominent from both northward and southward owing to a row of trees on the eastern slope, somewhat resembling a file of soldiers, whilst the western slope is fairly steep; Doro Karontang,

Charts 1696, 941b, 2759a.

Chart 3756.

close westward of Doro Radja, has four summits; Doro Toemboeh, 615 feet (187^{m}4) high, about 3 miles west-south-westward of Doro Raja, is a useful mark for Straat Molo.

The island is almost uninhabited, and the only village is on the north coast, near the entrance to Straat Molo; water is obtained from wells, as there are no streams. There are numerous wild horses in the middle of the island, and deer abound. The Komodo dragon (*see* page 257) is also found on this island.

Northern side of Rindja.—Off-lying islets and dangers.—The north coast of Rindja between Toro Nggikok (page 261) and Toro Kaloh, nearly 3 miles eastward, is low, marshy and fronted by a number of rocks, extending about one mile offshore; the outermost of these, lying nearly 1½ miles north-westward of Toro Kaloh, is a rock awash; nearly 2 cables southward of this danger is a rock above water, and midway between the latter and the northern side of Rindja are three more rocks, one above water, and the others having depths of less than 6 feet (1^{m}8) over them.

Lehok Kima, entered between Toro Kaloh and a point about 2 miles south-eastward, affords good anchorage, over muddy bottom, out of the influence of the tidal streams; the shores are mostly covered with mangroves, interspersed by rocky points. At the head of the bay are two creeks, the eastern one having a small fishing settlement at the head. Three reefs, generally marked by discoloration, lie on the western side of Lehok Kima; the northernmost, with a depth of 1¼ fathoms (2^{m}3) over it, lies about three-quarters of a mile southward of Toro Kaloh and nearly 2 cables offshore; the middle one, with a depth of 3 feet (0^{m}9) over it, lies nearly 1½ miles southward of Toro Kaloh and about 3¼ cables offshore; the southernmost, also with a depth of 3 feet (0^{m}9) over it, lies about 2¼ miles southward of Toro Kaloh (*Lat. 8° 37′ S., Long. 119° 40′ E.*) and half a mile offshore. A vessel approaching Lehok Kima from westward will pass about 3¾ cables outside the rocks lying north-westward of Toro Kaloh by keeping the southern side of the rocky islet off the middle of the north-west coast of Padar in line with Tanjong Nggikok, bearing 238°; when Toro Kaloh bears 146° the bay is just open, and the vessel can steer for it.

Lehok Boeaja (Buaya) lies north-eastward of Lehok Kima and is separated from it by a narrow tongue of land; this bay is encumbered by islets and reefs. Gindang (Rinja kechil), 300 feet (91^{m}4) high, lies close off the north coast of Rindja and about 3½ miles eastward of Toro Kaloh; two rocky islets lie about one mile north-westward of Gindang, and a rock, with a depth of 2 feet (0^{m}6) over it, lies about 3 cables southward of the south-western of these. An islet, fringed by a reef, lies 3 cables north-westward of the same islet.

Kaäba, 2¾ miles eastward of Gindang, is a low, marshy islet lying on the northern extremity of a reef, which dries, with a smaller islet lying close southward of it; between the southern end of this reef and the northern coast of Rindja is a narrow passage. Lehok Binga, a small bay on the northern coast of Rindja between Gindang and Kaäba, is mostly filled by the coastal reef. A shoal, with a depth of 2¾ fathoms (5^{m}0) over it, lies off the entrance to Lehok Binga and about midway between Gindang and Kaäba. Nusa Pimpé (Sapimpé), about 2 cables northward of Kaäba, is 295 feet (89^{m}9) high, and is in the form of

Charts 1696, 941b, 2759a.

Chart 3756.

a sugarloaf. Panikia (Panitia), about half a mile north-westward of Nusa Pimpé, lies on the north-eastern extremity of a reef, which dries, and which is marked by discoloration; the southern part of this islet is low and marshy, whilst the northern part is high and rocky, and has a couple of fishing huts on it.

Southern side of Rindja.—This coast is high and thickly wooded, and rises nearly perpendicularly from the sea in some places; in other parts there is a sandy beach. Lehok Oewada Dasami (Uwada Sami), the large bay on this coast, is to a great extent occupied by Nusa Kodé (Uwada Sami), a densely wooded, high island, steep on all sides except at the northern end. A reef, which dries, lies about midway between the northern extremity of Nusa Kodé and the Rindja coast, and about 3 cables westward of this reef is a rock awash, not marked by surf or discoloration. The best anchorage in Lehok Oewada Dasami is in the eastern of the two bights at the head, southward of a white sandy beach; it is advisable to enter this bay by the eastern passage, especially at high water.

The western side of Rindja has been described on page 261; the eastern side is described with Straat Molo, on page 271.

STRAAT MOLO.—Straat Molo, between the eastern side of Rindja and the southern part of the western side of Flores, is only navigable for small vessels on account of the narrow northern entrance, through which strong tidal streams run; it is, therefore, seldom used. Anchorage can be obtained in the southern part of the strait in Lòhò Baroe (So Lo oh) and Sò Waloe (Walu) (page 273), on the Rindja side, and in Lehok Rasé and Telok Kenoepoer (Kenupur) (page 272), on the Flores side. Except for Linteh village (*Lat. 8° 40′ S., Long. 119° 49′ E.*), on the Flores shore at the southern end of the narrows, the shores and the islands in the strait are uninhabited.

Tidal streams.—The tidal streams in Straat Molo have a semi-diurnal character and are very strong in the narrows; in the area immediately northward of the narrows, and in the southern and wider part of the strait, they are, however, much weaker, the rate being less than in Straat Linta, except between Gili Mota and the Flores shore, when they are very strong at times.

The maximum rate observed, during the period of neap tides, viz., from one day before to three days after the quarters of the moon, was over 5 knots; the maximum rate at spring tides is not known. It is advisable to wait for the short period of slack water before attempting to pass through the narrows; vessels can anchor safely at the northern end, near Boasala (page 271), or at the southern end off Linteh village. There is practically no tidal stream in the bays on both sides of the strait.

Northern approach to Straat Molo.—Dangers.—Anchorages.—The west coast of Flores from abreast the islet Mandjaga (page 266) to the northern entrance of Straat Molo is mostly swampy, with only an occasional rocky part. Kélor, an islet, about 196 feet ($59^{m}7$) high, and sparsely covered with vegetation, lies about three-quarters of a mile west-south-westward of Mandjaga.

Gadoh lies close offshore on the coastal reef 2 miles south-south-westward of Kélor and is hilly, with a marshy coast, except the western extremity, which is rocky, with some rocks above water on the reef,

Charts 1696, 941b, 2759a.

Chart 3756.

which dries, fringing it; a steep-to 3-fathom ($5^{m}5$) patch lies about 2½ cables north-westward of the western extremity of Gadoh. A steep-to reef, which partly dries, and not always marked by discoloration when covered, lies half a mile north-north-westward of Gadoh, and westward of this reef, in the channel between Bangkau and the Papagaran islands, are four reefs which dry, all steep-to; the passage between the easternmost of these reefs and the Flores coast was reported, in 1925, to be narrower and less deep than the chart shows.

Boasala, lying close offshore 6 cables south-south-westward of Gadoh, is a wooded islet with a flat summit, 512 feet ($156^{m}1$) high, and has a prominent, bare, reddish patch on its south-western side; Nisa Poeroeng (Purung), low and covered with mangroves, lies on the reef, which dries, extending from the southern side of Boasala. About 7 cables south-eastward of Boasala there is a small bay with a few huts at the head; in the vicinity of the southern entrance point of this bay, the coast is rocky.

Anchorage may be obtained almost anywhere in the northern approach to Straat Molo. The best anchorage and the most free from the tidal stream is in the bay off the northern coast of Rindja westward of the entrance to the strait, or in the bay between Gadoh and Boasala. A vessel waiting for slack water in the strait can anchor westward or northward of Boasala, where the tidal stream is not strong.

For the description of the islets and dangers off-lying this part of the Flores coast, *see* page 264, and for those off the north coast of Rindja, *see* page 269.

Chart 895, plan of Molo narrows.

Nauw van Molo.—The shores of Nauw van Molo (Molo narrows), at the northern end of the strait, are low and mostly marshy, with a few rocky parts on the eastern shore. The two islets Tukoh Selat (Salat) Molo (*Lat. 8° 37′ S., Long. 119° 49′ E.*) and Moeleng (Mulian) lie in this part of the strait; the former is a rocky islet covered with vegetation, and the latter consists of two rocky islets, covered with vegetation and almost joined to each other. At Toro Waitimbang, on the western side of the narrows, the Rindja coast turns westward and the strait widens out.

Chart 3756.

Southern part of Straat Molo.—Islands and dangers.—The east coast of Rindja between Toro Waitimbang and Lòhò Baroe is mostly muddy and overgrown with mangroves, with a few rocky points formed by spurs from the mountains lying close to the coast; the only sandy beach, named Kerontong, which is noticeable from a distance, is about 2 miles westward of Toro Waitimbang. The shores of Lòhò Baroe are mostly rocky, varied by small sandy beaches and patches of mangroves. At the head of Sok Òtò (Lehok Oto), in the south-western part of Lòhò Baroe, is a clump of coconut palms and the remains of a former settlement; a reef, with a depth of 3 feet ($0^{m}9$) over it, lies 3 cables offshore here. The inlet in the northern part of Lòhò Baroe is occupied to a great extent by a shoal spit extending for about one mile in a southerly direction from the head of the bay; a rock, 23 feet ($7^{m}0$) high and covered with vegetation, lies on a part of this spit, which dries.

Linteh village is situated on a sandy beach at the head of a small

Charts 1696, 941b, 2759a.

bay on the Flores side immediately southward of Nauw van Molo. A shoal of sand and stones, with a depth of 3¼ fathoms ($5^{m}9$) over it, lies about 3½ cables north-north-eastward of Toro Wairiï, the southern entrance point of this bay; at low water this shoal is marked by discoloration. About 3 cables farther northward is a 4¼-fathom ($7^{m}8$) patch, not marked by discoloration.

Nusa Kampas, lying near the Rindja coast 9 cables west-south-westward of Toro Waitimbang, is a low, rocky islet covered with vegetation.

Rohbong (Reboh), about half a mile south-westward of Nusa Kampas and separated from Rindja by a channel about 2 cables wide, has two bare summits, the higher of which has an elevation of 276 feet ($84^{m}1$); the islet has a few steep points, but elsewhere there are mangroves or sandy beaches. A reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies 4 cables westward of the southern extremity of Rohbong, and a rock awash lies 9 cables west-south-westward of the same point; these two dangers are not marked by discoloration.

Nusa Dangka, about 1½ miles south-westward of Rohbong and about 2½ cables off the Rindja coast, is 128 feet ($39^{m}0$) high, and saddle-shaped; a rock awash lies about 2½ cables south-westward of the southern extremity of this islet, and a small reef, with a depth of 2 fathoms ($3^{m}7$) over it, lies close to the Rindja coast westward of the islet.

Moeang (Muang), about three-quarters of a mile south-eastward of Nusa Dangka, has three summits, the southern and highest being near the southern extremity of the island, whilst the middle one is low and not particularly noticeable. Moeang is fringed by a steep-to reef of sand and stones, extending about half a mile from its eastern side; a rock awash lies on this reef about 3 cables westward of the northern end of the island; a similar rock, which never breaks and is not marked by discoloration, lies about the same distance southward of the island.

Toro Ladjar (Lajar), about 1¼ miles south-south-westward of Toro Wairiï, is a bare, rocky point, 66 feet ($20^{m}1$) high, and is noticeable from southward, when it appears as an islet; a 2½-fathom ($4^{m}6$) patch lies about 2 cables offshore and 1½ cables northward of this point. Ini Tengah, an islet about 60 feet ($18^{m}3$) high, lies on the outer end of a projecting part of the coastal reef one mile southward of Toro Ladjar; there is a sandy beach here, and Nanga Lo-oh, a small rivulet, flows out.

Lehok Rasé and Telok Kenoepoer, entered about 1¼ and 2½ miles, respectively, southward of Ini Tengah (*Lat. 8° 43′ S., Long. 119° 48′ E.*), both afford anchorage for small vessels. Lehok Rasé has a sandy beach at the head, and the high land retreats some distance from the coast here; the northern entrance point of the bay is moderately high, and there is a low, sandy strip between it and the high land eastward. At the northern side of the entrance to Telok Kenoepoer the coast rises vertically from the sea; two rocks lie close off the southern entrance point of the bay, the outer one being square and about 60 feet ($18^{m}3$) high. The coast for about 6 cables southward of these two rocks is very steep and bears the general name Toro Roengking (Rungking); two rocks just above water lie close off the southern extremity of Toro Roengking, and a rock awash lies close southward of them.

Southward of Lòhò Baroe, on the western side of the strait, there are several small bays along the Rindja coast, separated from each other by rocky projections. Sò Waloe (Walu) is a small bay entered between Toro Waloe (Walu), the southern entrance point of Lòhò Baroe, and Toro Ama Raoe (Sobor), about 6 cables southward; the latter point is exceptionally prominent, as an arched rock lies on the reef, which dries, extending a short distance from it; a rock awash lies close southward of the arched rock. Toro Siè (Waingajah), 6 cables southward of Toro Ama Raoe, can be identified by the reddish-brown colour of the rock and by a tunnel bored through it in a south-westerly and north-easterly direction; a rock awash, not always marked by surf, lies about one cable east-north-eastward of this point.

Telok Perapat is a small bay on the Flores coast entered about one mile south-eastward of the southern end of Toro Roengking, and is frequently visited by praus proceeding between Labuan Badjo and Soemba, and also by fishermen from Linteh. The southern entrance point is high, rocky, and of a yellowish-brown colour. Sendol, a flat islet, lies off the entrance.

Baleh, an islet lying 7 cables southward of Toro Roengking and about 3½ cables off the Flores coast, has two summits forming a saddle; the north-eastern and higher of the two is rounded, and has an elevation of 354 feet (107^{m}9), the other is somewhat conical. The islet rises steeply from the sea nearly everywhere. An islet with two summits, forming a saddle, and also a rock above water, lie off the western side of Baleh.

Gili Mota, south-westward of Baleh and separated from it by a passage about 6 cables wide, is high and densely overgrown with trees and reeds; it has three summits, the highest, which has an elevation of 1,447 feet (441^{m}0), in about the middle of the island, being somewhat conical and very prominent. The western and southern coasts rise steeply from the sea, but the northern side slopes more gradually. On Toro Kembang, the north-eastern extremity of the island, is a large tree with a white trunk, resembling a prau under sail; from northward this tree is plainly visible when nearing Toro Roengking, and from southward when bearing between north-west and north. *See* view facing page 274.

A dangerous rock awash, which seldom breaks and is never marked by discoloration, lies in mid-channel between Toro Kembang and the western side of Flores.

Aspect.—In addition to the mountains in Rindja, described on page 268, the following mountains in Flores are prominent from Straat Molo:—Golloh Banta, 1½ miles eastward of Linteh village, has three summits, the highest of which has an elevation of 1,757 feet (535^{m}6); Doro Missé, about 1¼ miles southward of Linteh, has a remarkably sharp peak 1,142 feet (348^{m}1) high, like a bare pillar; there are some more summits south-westward, the highest being a blunt cone about the same elevation as Doro Missé. Golloh Sorroh (*Lat.* 8° 44′ S., *Long.* 119° 51′ E.), about 3½ miles south-south-eastward of Doro Missé, has a rounded summit 2,736 feet (834^{m}0) high, when seen from south-westward, but appears conical from westward. Zadelberg, nearly 3½ miles south-eastward of Golloh Sorroh, has two peaks, the northern being sharp and the southern blunt.

Anchorages.—Directions.—Anchorage can usually be obtained in the various bays on either side of Straat Molo. Large vessels can

Chart 3756.

find good anchorage in Lòhò Baroe, outside the influence of the tidal streams.

There is good anchorage for small vessels in the bay off Linteh village, in depths of from 7 to 8 fathoms ($12^{m}8$ to $14^{m}6$), with Tukoh Selat Molo in line with the Flores coast southward of it, bearing 359°.

Telok Perapat affords anchorage for small vessels; there are depths of from 13 to 17 fathoms ($23^{m}8$ to $31^{m}1$) near the southern shore, and from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$) near the northern shore. Farther inside is an inner cove, with depths of 4¾ fathoms ($8^{m}7$); the shore of this inner cove is muddy, covered with mangroves, and a small stream flows out.

From northward a vessel should steer about 180° and pass eastward of Poengoe eilanden and thence midway between the islands Koekoesan and Kélor. When the larger of the two rocks between Tebolon and Kokotoan is in line with the north-western side of Kélor, bearing 025°, the vessel should keep this alignment on astern, which will lead south-eastward of the small reef, which dries, northward of Gadoh. When the eastern part of Kanawa is still just visible north-eastward of Bangkau, bearing about 333°, it will be seen that Mandjaga berg is in line with a steep, cliffy point on the Flores coast; this latter alignment kept on astern, bearing 068°, will lead north-westward of the 3-fathom ($5^{m}5$) patch off the western side of Gadoh. When the western sides of Poengoe besar and Bangkau are in line, bearing about 002°, the vessel should alter course southward, passing westward of Boasala and Nisa Poeroeng, and thence steer for Nauw van Molo.

Charts 895, plan of Molo narrows, 3756.

Nauw van Molo can be navigated by eye, awaiting if possible the period of slack water; Tukoh Selat Molo and Moeleng can be passed on either side, but there is more room eastward of the former. Course may then be shaped to pass eastward of Rohbong and Moeang, bearing in mind that a reef extends fully half a mile from the eastern side of the latter.

From southward Straat Molo presents no difficulties, and the entrance can be easily identified by Gili Mota (*Lat. 8° 49′ S., Long. 119° 48′ E.*). The channel westward of this island, being wide and free from danger, is preferable. If using the eastern channel, the dangerous rock midway between Gili Mota and Flores may be avoided by bringing Doro Toemboeh, the 615-foot ($187^{m}4$) summit on the north-eastern peninsula of Rindja, in the gap between Baleh and the islet close westward, bearing 331°; this alignment leads about midway between the rock and Toro Kembang, and a mid-channel course may then be steered between Gili Mota and Baleh.

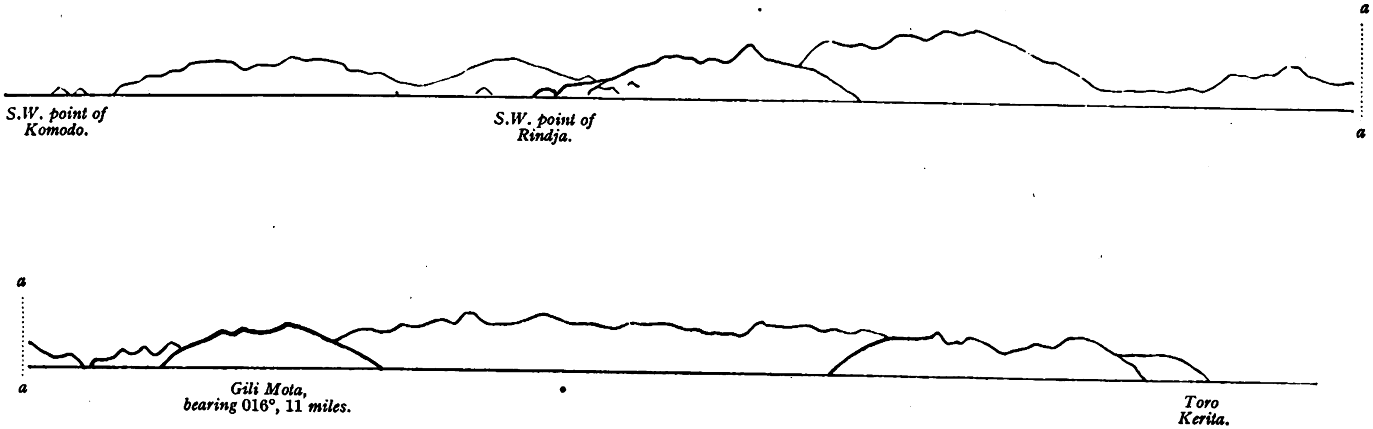
Charts 1696, 1697.

FLORES.—A chain of mountains, attaining a considerable elevation in many places, traverses the middle of this island from west to east, and from both sides ridges run northward and southward, forming steep promontories. In the western part of the island there are no volcanoes, but in the eastern half, especially near the east and south coasts, there are many, some of them still active.

Numerous rivers flow out on the north and south coasts, but none of them is of any use to shipping, and only a few are navigable near the mouth for light craft at high water; in the rainy season they

Charts 941b, 2759a.

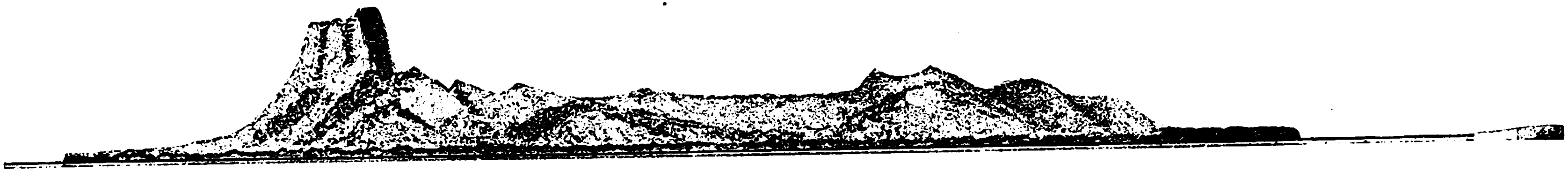
To face page 274.



View, in two parts, of southern approach to Straat Molo.

(*Original dated* 1947.)

To face page 275.


Amboe Aangah.

Flores, south coast; Toren eiland from southward.

(*Original dated* 1906.)

Charts 1696, 1697.

are not navigable higher up owing to the strong currents, and in the dry season they are too shallow or dry altogether.

The true natives of the island exist mainly by agriculture and horse and cattle breeding, and seldom dwell on the coasts; the inhabitants of the coastal villages are a mixed race from other islands, and are traders and mariners.

SOUTHERN SIDE OF FLORES.—With the exception of the isthmus between Maoemeré (Maumere), on the northern side of Flores, and Lela on the southern side, practically the whole of the southern side of the island is occupied by rugged mountains; whole stretches are only overgrown by reeds or a scanty growth of trees. The coast is steep-to, and there are no outlying dangers; only in a few places is there any coastal reef, and then it never extends for more than half a mile. The western part is more or less protected from the sea by Soemba, but even a slight sea causes surf on the coast.

In the shallow bights and occasional bays there is more or less serviceable anchorage, according to the prevailing monsoon. The principal villages on the coast from west to east are Nangalele, Nangaramoe (Nangaramu), Mborong, Aemere, Ende, Maoeloö (Mauloö), Paga, Lela, and Sika besar.

Tidal streams.—The tidal streams are semi-diurnal, weak, and run about parallel with the coast. During the survey, from November to March, the west-going stream was generally stronger than the east-going; the rate never exceeded 1½ knots, except in the channel between Toren and the coast, when a rate of 2 to 3 knots was observed, the stream running in the direction of the channel.

Chart 1696.

Coast.—Anchorages.—Toro Kerita (*Lat. 8° 52′ S., Long. 119° 55′ E.*), the south-western extremity of Flores, appears as an island from eastward or westward, and the 1,355-foot (413^{m}0) summit close within it can be easily identified. The coast in the vicinity of the point is bare and steep, in places vertical; the upper part of the peninsula is wooded.

Lehok Tekaka, a small bay on the eastern side of Toro Kerita, affords good anchorage in the west monsoon, to vessels with local knowledge, almost in the middle, in a depth of 25 fathoms (45^{m}7).

Eastward of Toro Kerita the steep, wooded land changes to very regular, flat ridges, covered with reeds, sloping down gently to the coast, where they terminate frequently in steep cliffs, about 60 feet (18^{m}3) high, fronted by a sandy beach; these cliffs have been fashioned into peculiar points, caves, etc., by the action of the sea. Nanga Nisa flows out about 4½ miles north-eastward of Toro Kerita, and fairly sheltered anchorage can be obtained by vessels with local knowledge in a small bight about half a mile eastward of this rivulet, in a depth of 22 fathoms (40^{m}2), nearly 4 cables offshore.

At Ngaru Méré, a steep point about 5 miles eastward of Nanga Nisa, the cliffy part of this coast terminates, and eastward of this point the land becomes lower and flatter, and the beach wider. From westward Ngaru Méré appears as a rather low point sloping gradually.

Amarédo gebergte and Séso berg, from about 3 to 5 miles north-westward of Ngaru Méré, appear as an isolated group when seen from south-eastward; Amarédo has four summits, and Séso is a steep, massive

Charts 941b, 2759a.

mountain rising from the south-eastern slopes of Amarédo, and is particularly prominent from south-westward.

Nangalele baai is entered between Ngaru Méré and Toro Repih, 10 miles eastward, and affords anchorage to vessels with local knowledge, in a depth of 24 fathoms (43^m9), southward of the mouth of Nanga Lele, which flows out through a mudbank, about a quarter of a mile wide, at the head of the bay; the village of Nangalele stands about half a mile within the mouth of this river, and 3 miles farther inland is Tangi village, standing on the outer end of a steep ridge, 371 feet (113^m1) high. Behind the bay there is a wide, undulating plain between Amarédo gebergte and Moenti (Munti) gebergte, which latter approaches the coast near Toro Repih.

Off-lying island.—Toren eiland or Gelinta is separated from the Flores coast at Tanjong Anabarah, about 3¾ miles eastward of Repih, by a channel one mile wide and clear of dangers. The island is rather bare, and exceptionally prominent on account of the pillar-shaped peak Amboe Aangah, 1,919 feet (584^m9) high, in the south-western part. *See* view facing page 275. The island is almost entirely surrounded by a sandy beach, and on the eastern side the coastal reef extends for about 2¾ cables offshore; the southern extremity should not be approached within a distance of at least half a mile.

Anchorage may be obtained off the north-western side of the island, in depths of from 22 to 30 fathoms (40^m2 to 54^m9), with Amboe Aangah peak bearing 175°, but the tidal stream here sometimes attains a rate of 3 knots.

Coast.—Tanjong Lemoe (Lemu), 2¼ miles eastward of Tanjong Anabarah (*Lat. 8° 51′ S., Long. 120° 17′ E.*), is a low, wooded point; thence to Tanjong Watoe Ipoe (Watu Ipu), about 18 miles eastward, the coast forms a bight, along the shore of which there is a narrow, wooded plain, behind which the land rises steeply. Eastward of Nangaramoe village, about 4 miles north-eastward of Tanjong Lemoe, this plain becomes wider and merges into the valley of the Nanga Tilli, which reaches the coast 8½ miles east-north-eastward of Tanjong Lemoe, between Moenti gebergte and the range of which Potjo (Pocho) Leok is the highest peak (*see* page 277); eastward of Nanga Tilli the latter range descends gradually to the coast. About 1½ miles eastward of the mouth of Nanga Tilli is a prominent rock on the high-water line, named Batu Ladja.

In the bight between Tanjong Lemoe and Tanjong Watoe Ipoe the bottom is too steep to afford much opportunity of anchoring, and the 100-fathom (182^m9) line is never more than about three-quarters of a mile offshore. A vessel with local knowledge may anchor in the middle of the small bay off Nangaramoe village, in a depth of 38 fathoms (69^m5), close to the reef, with the points of land south-westward in line. Anchorage may also be obtained in the eastern part of the bight, off Mborong village, situated about one mile northward of Tanjong Watoe Ipoe, in depths of from 19 to 30 fathoms (34^m7 to 54^m9), from one to two cables offshore; a river runs through a valley here, and there is a wooden board about half a mile south-eastward of the entrance. South-eastward of Tanjong Watoe Ipoe the coast becomes steep and rocky and within it there is a narrow strip of low land, thence rising fairly steeply behind to Potjo (Pocho) Ndèki; eastward of this mountain the land becomes flatter and is to a great extent covered

Chart 1696.

with reeds. Some of the points along this part of the coast are of a striking white colour, such as Tanjong Jarakeh, about 8½ miles east-south-eastward of Tanjong Watoe Ipoe, and Tanjong Saoekoemeh (Saukumeh), about 1¾ miles farther eastward.

Mountains.—Moenti gebergte has no prominent peaks, and the previously mentioned Potjo (Pocho) Leok, situated 6 miles northward of Batu Ladja, is the highest summit of another range. Northward of these mountains is a high chain with summits differing little in elevation from each other; behind this chain rises the massive Potjo (Pocho) Likang, with a round summit about 10 miles northward of Batu Ladja.

Potjo Ndèki, forming the south-eastern side of the valley near Mborong village, is an isolated mountain with a regular, round summit, 3,115 feet (949$^{\mathrm{m}}$5) high; from a westerly direction it can be identified from a considerable distance, and a lower summit will then be seen on its north-western slope.

Charts 2466, plan of Aemere bay, 1696, 1697.

Aemere baai.—Light.—Aemere baai is entered between Tanjong Saoekoemeh, a noticeable white steep point, and Tanjong Wai Waroe (Waru), 6 miles eastward. The western shore of the bay, is low, steep, and rocky, the land rising westward to Kombah, the remains of an old crater, and 2½ miles north-westward of Tanjong Saoekoemeh, and Loemoe (Lumu), which has a round summit, 1½ miles north-eastward of Kombah.

Tanjong Wai Waroe (*Lat. 8° 53′ S., Long. 120° 53′ E.*) and the eastern shore of the bay are low, but the land rises rapidly to the slopes of a massive chain of mountains running in a northerly and southerly direction; the principal of these are Lobo Boetoe (Butu), a saddle mountain, 9½ miles north-north-eastward of Tanjong Wai Waroe; Watoe (Watu) Ata, a conical peak, 5,310 feet (1,618$^{\mathrm{m}}$4) high; Watoe (Watu) Atagae, another saddle mountain; and the steep and rocky Langa gebergte, with three peaks. Southward of the latter, and separated from them by valleys and crevices is the very regular, conical volcano Iné Rié, 7,361 feet (2,243$^{\mathrm{m}}$6) high, situated 5 miles eastward of Tanjong Wai Waroe and one of the most prominent landmarks on the southern side of Flores.

There is a noticeable zinc Customs shed at Aemere village, situated on the north-eastern side of the bay, about 3 miles northward of Tanjong Wai Waroe. A light is exhibited from a wooden post close to this shed.

Reede Aemere is bounded by the arc of a circle with a radius of one mile from the light-structure.

Anchorage may be obtained, in a depth of about 27 fathoms (49$^{\mathrm{m}}$4), black sand, with the middle Customs shed bearing 059° and the near point south-eastward, 150°, but the depths about half a mile offshore are considerable. The tidal stream is fairly strong at times.

Aemere is the best landing place in the western part of the south coast of Flores, especially in the South-east monsoon; it is also in a favourable position for communication with the land behind the bay, which is one of the most fertile districts in Flores. Aemere baai is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 1697.

Coast.—The coast between Tanjong Wai Waroe and Ngaru Beré,

Charts 941b, 942a, 2759a.

Chart 1697.

about 8½ miles south-eastward, runs round the foot of Iné Rié and is densely covered with vegetation. Tanjong Boba is a cliffy point about 2 miles eastward of Ngaru Beré, and about 1½ miles east-north-eastward of Tanjong Boba there is a large round-topped tree on the coast. The coast between Tanjong Boba and Ngaru Dai, 17 miles eastward, is clear, with great depths close to the coast, and there is no shelter for anchoring; the western part is inhabited. Tanjong Rano, 3½ miles east-north-eastward of Tanjong Boba, is a prominent rocky point with a sandy beach eastward of it; Tanjong Mbawa, 3½ miles east-north-eastward of Tanjong Rano, is also rocky and fairly noticeable. Tanjong Mari, about 7 miles eastward of Tanjong Mbawa, is a fairly steep, bare point with a spur projecting eastward from its extremity.

From Iné Rié a mountainous ridge of volcanic appearance runs eastward and parallel with the coast for about 10 miles; Watoe (Watu) Sipi, 4,326 feet (1,318^{m}5) high, and a summit of 4,523 feet (1,378^{m}6) close eastward, the highest peaks of this range, about 5 miles south-eastward of Iné Rié, are not particularly noticeable. The coast between Tanjong Boba and Ngaru Dai is dominated by the massive Amboe Romboe (Ambu Rombu), 7,049 feet (2,148^{m}5) high, which, although not quite as high as Iné Rié, is more impressive on account of its extensive base, wide crater, and broad, bare summit; Redjo (Rejo), about 4½ miles south-eastward of Amboe Romboe, is lower and not so prominent.

Ende baai.—Ende baai, entered between Ngaru Dai and Tanjong Ija (Iya), about 19 miles eastward, is the largest bay on the south coast of Flores, and is backed by hills, the higher mountains lying somewhat farther inland. On the western side of the bay is Ngaru Tangi (*Lat. 8° 52′ S., Long. 121° 19′ E.*), an isolated mountain rising steeply from the sea about 3 miles northward of Ngaru Dai to an elevation of 4,536 feet (1,382^{m}6); on its south-eastern slope is a fairly sharp and noticeable summit, and near the coast eastward of the latter is a conspicuous hill with a mass of rocks, covered with grass, on the beach below it. Keri Doa, about 6½ miles northward of Ngaru Tangi, is a saddle mountain, 4,168 feet (1,270^{m}4) high, one summit being rounded and the other sharp. From the eastern part of the bay Amboe Romboe can be seen in the background between Ngaru Tangi and Keri Doa. In the limestone formation of the northern shore of the bay are many caves and hollows, with some noticeable white and grey patches. The eastern side of the bay is formed by Ija peninsula (page 279).

Nusa Ende, lying near the middle of the bay, consists of two high hills, connected to each other by a comparatively low, narrow ridge, forming a small bay on each side; Doeriwoi, the southern and highest hill, has a prominent bare summit, 1,544 feet (470^{m}6) high. The island is well cultivated and has several villages on both the eastern and western sides, whilst there is a large village, named Reko Reko, on the northern extremity. In calm weather a small vessel with local knowledge can anchor in the western bay, off Mando village, or off the east coast, abreast a rock on the coastal reef, named Watoe Koeroe, southward of Reko Geo baai; the coastal reef on the western side of the southern part of the island extends for about 3 cables offshore. Songo, a rock 64 feet (19^{m}5) high, lies about 2 cables off the northern part of the eastern side of the island.

The depths in Ende baai are very great, on the western side the

Charts 942a, 2759a.

Chart 1697.

100-fathom (182$^{\text{m}}$9) line lies nowhere more than 7 cables from the shore. The least depths are on the northern side of the bay, and there is good anchorage for vessels with local knowledge westward of Nangapandan village, situated about 12 miles north-westward of Tanjong Ija (Iya), about half a mile offshore, in depths of from 22 to 25 fathoms (40$^{\text{m}}$2 to 45$^{\text{m}}$7), with Wongé, situated about 5½ miles northward of Tanjong Ija, in line with Tanjong Batoe Ladja, about 8 miles north-westward of Tanjong Ija, bearing about 093°, and the eastern of two noticeable grey patches on the shore westward of the village, bearing 351° ; in the west monsoon vessels lie here better than off Ende, but landing is more difficult. The shores of Ende baai are well populated, and there are several villages and coconut plantations along the shores.

Chart 2466, plan of Ende and Ipi roads.

Reede Ende.—Light.—Anchorage.—Ende, the capital of the Flores division of the Timor Residency, is situated on a plain forming the isthmus of Ija peninsula, which separates Ende baai from Ipi baai ; it can be identified by a white building with a dark roof and a white building with a red roof, both on the foreshore, one mile and half a mile north-westward, respectively, of the pier, also by the native town eastward of the pier, and the two masts of the radio station. There is a pier, equipped with two small cranes, about one cable long, with a depth of 3 fathoms (5$^{\text{m}}$5) at its head.

Reede Ende is bounded by the arc of a circle, drawn with a radius of one mile, from the head of the pier.

A light (*Lat. 8° 51′ S., Long. 121° 39′ E.*) is exhibited, at an elevation of 29 feet (8$^{\text{m}}$8), from an iron column, 16 feet (4$^{\text{m}}$9) in height, on the head of the pier at Ende.

The 20-fathom (36$^{\text{m}}$6) line lies nearly 1½ cables offshore off Ende, and anchorage can be obtained from 1½ to 2 cables offshore, in depths of from 30 to 36 fathoms (54$^{\text{m}}$9 to 65$^{\text{m}}$8). During the South-east monsoon a moderate swell runs into the bay especially in the afternoon ; during the west monsoon, it is better to anchor in Ipi baai. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. There is a harbour doctor, and two hospitals.

There are two mooring buoys for small craft about half a cable offshore.

The coast of the Ija peninsula is steep and rocky, especially in the southern part, where the volcano Ija is constantly emitting smoke and flames, from its active crater on the southern side ; this volcano, with its bare stony slopes, thickly covered with sulphur and ashes, and its wide, gaping crater, is a good landmark. At the northern end of the peninsula is Poei (Pui), a crater of very regular formation, and between it and Ija a ridge runs across the peninsula. Close northward of Ende are three noticeable hills : Kerimana, bare except for a small wood on the summit, stands close to the coast, about 1¼ miles north-north-westward of the light-structure ; Kingo, about one mile eastward of Kerimana ; and Wongé, one mile north-eastward of Kingo, more thickly wooded and with a broader summit. The coast in the vicinity of Tanjong Ija is so steep that large rocks sometimes fall into the sea from above.

Ipi baai.—Anchorage.—Ipi baai, on the eastern side of Ija peninsula, affords safe anchorage during the west monsoon, and there is a

Charts 942a, 2759a.

Chart 2466, plan of Ende and Ipi roads.

good road across the isthmus to Ende. Northward of Poei the land is flat and the shore is fronted by a sandy beach as far as a steep point on the northern side of the bay, about 3½ cables eastward of Kowa, an islet, which lies close offshore about 4 miles north-north-eastward of Tanjong Ija. Ipi village, consisting of a few houses, is situated at the south-western end of the sandy beach; there is a noticeable round-topped tree here in the midst of some palm trees.

The best anchorage is off Ipi village, with the northernmost of the above-mentioned trees in line with Kerimana, bearing about 308°, and a low point, covered with trees, on the western shore of the bay, bearing 185°; a vessel will lie here in a depth of about 30 fathoms ($54^{m}9$), 2½ cables offshore, but it must be borne in mind that northward of this anchorage the coastal reef extends a short distance offshore. Landing is troublesome, as even a slight swell causes a fairly heavy surf.

Chart 1697.

Coast.—Eastward of the steep point near Kowa there are a few grey sandy beaches along the northern shore of Ipi baai, but between Ngaru Poro, the low eastern point of the bay, 5½ miles east-north-eastward of Tanjong Ija, and Tanjong Boea (Bua), 4¾ miles farther eastward, these beaches practically disappear, and the coast consists of almost vertical cliffs, the termination of ridges from the mountains close to the coast. Close eastward of Ngaru Poro a river flows into the sea through a noticeable cleft, and the large village Ngaroe (Ngaru) Poro is situated about 3 cables inland; there are some more villages near Loö Ronga, a steep point, with a rock above water close off it, about midway between Ngaroe Poro and Tanjong Boea. Lapi Doro, about 5 miles northward of Tanjong Boea (*Lat. 8° 52′ S., Long. 121° 49′ E.*), has a regular, rounded summit 5,674 feet ($1{,}729^{m}5$) high, and thence a chain of mountains, with no prominent peaks, runs towards the coast in a south-westerly direction.

Eastward of Tanjong Boea the land opens out into a wide, well populated valley, cultivated up to the slopes of Lapi Doro; about 1¾ miles north-eastward of Tanjong Boea, on a small plateau by the coast, is Waloe (Walu) Roga, a noticeable village, and about one mile farther north-eastward is Ngéra village, situated on Tanjong Toega, a fairly steep point of a brownish colour.

Mboeli (Mbuli) baai is entered between Tanjong Toega and Ngaru Dori, 3¾ miles east-north-eastward, but it does not afford sheltered anchorage in either monsoon; Ngaru Dori is a steep, rocky point of a reddish colour, and is formed by the southern slopes of Risé, a dome-shaped mountain, 2,308 feet ($703^{m}4$) high. The coast between Ngaru Dori and Tanjong Oeloe Wiro, 7½ miles east-north-eastward, is not so clear as elsewhere on the south coast of Flores, although there are no dangers beyond 7 cables offshore. Koema (Kuma), a mountain 2,738 feet ($834^{m}6$) high, lies near the coast about 3¼ miles east-north-eastward of Ngaru Dori; its slopes form two rounded, rocky, high points, the eastern of which is named Ngaru Koema; some rocks lie close off this point. Ngaru Itjoe Katé lies about 1¾ miles east-north-eastward of Ngaru Koema, and the coast between these two points is low and fronted by a sandy beach; two small rivers flow out through a valley here, and a noticeable black rock lies about one cable off the mouth of the eastern river; Lioe (Liu) village stands a short distance inland on the latter river, but is not readily seen from seaward, but

Charts 942a, 2759a.

Chart 1697.

there are a few houses on the beach on the eastern side of the river mouth. Between Ngaru Itjoe Katé and Tanjong Oeloe Wiro the coast forms a small bight, in the eastern part of which is the rocky islet Koka; close to the coast at the head of this bight is a prominent light-green hill, 1,009 feet ($307^{m}5$) high.

Mbotoelena (Mbotulena), about 3¼ miles northward of Lioe village, is the western of two noticeable peaks, and is a bare mountain with a wood on the summit. Boeboeti (Bubuti), about 4 miles northward of Mbotoelena, is a steep mountain; when seen from south-eastward it has an arched outline, terminating abruptly westward in its highest peak. Geli Koeroe (Kuru), about 3 miles north-westward of Boeboeti, is difficult to identify.

Bocht van Paga.—Anchorages.—Bocht van Paga is entered between Tanjong Oeloe Wiro and a point 10 miles east-north-eastward. Except for an occasional steep and rocky part the shores of this bight are generally low and fronted by a sandy beach, the land rising gradually behind. From one to 1½ miles north-eastward of Tanjong Oeloe Wiro are the two large villages, Maoeloö (Mauloö) and Paga, situated fairly close to each other on the shore; the houses have high roofs and there is a white limestone point at each end of Maoeloö. The coastal reef extends for about half a mile off these villages; the outer edge dries, but praus lie at anchor between this edge and the shore.

Lela (*Lat. 8° 44′ S., Long. 122° 10′ E.*), in the north-eastern part of the bight, comprises a number of villages situated along the beach and on the slopes of the hills; there is a Roman Catholic missionary station here, but the buildings, situated a little distance inland, are not easily seen from seaward, although the road leading to them from the beach is plainly visible; immediately eastward of the road is the dry bed of a former river, which has a steep eastern bank. There is a good road from Lela to Maoemeré, on the north coast of Flores.

Sika besar, a village situated on a small plain near the eastern entrance point of Bocht van Paga, contains a Roman Catholic church with a spire and zinc roof, visible from a considerable distance. A reef extends about 2 cables from the point; there is a good landing place in a small bight eastward of the point, where there are a number of noticeable sheds off which large praus lie. A good road runs from Sika besar to Lela.

The depths off the western shore, and off the western half of the northern shore of Bocht van Paga are moderate, but there is no shelter in either monsoon; in the eastern part the depths are greater, but vessels are somewhat sheltered in the South-east monsoon. Anchorage may be obtained by vessels with local knowledge off Lela, in a depth of about 32 fathoms ($58^{m}5$), with the road to the mission buildings just open, and Dolowai, situated 2¾ miles north-eastward of Sika besar and 3,132 feet ($954^{m}7$) high, with a small wood on the crest, bearing 076°; landing can be effected close eastward of the river bed, where there are generally praus lying on the beach. The best anchorage off Sika besar, although entirely open, is about 3 cables offshore, with the church bearing about 000°.

Coast.—Immediately eastward of Sika besar the mountains approach close to the sea, and form a steep, inaccessible coast. Off the coast between Tanjong Wokar, a steep point about 6 cables eastward of Sika besar, and Ngaru Baloek (Baluk), 4½ miles farther eastward,

Charts 942a, 2759a.

Chart 1697.

in places the 100-fathom ($182^{m}9$) line is barely one cable offshore; approaching Ngaru Baloek, however, the depths decrease, and anchorage may be obtained by vessels with local knowledge about half a mile southward of this point, in depths of from 20 to 30 fathoms ($36^{m}6$ to $54^{m}9$). Ngaru Baloek is a steep, rocky point, 260 feet ($79^{m}2$) high, with a small sandy beach at the foot. Djele (Jelé) gebergte, which probably formed the northern side of a formerly large crater, now broken down on the southern side, lies behind this portion of the coast (*see* also page 294); Dolowai is the highest peak. Eastward of Ngaru Baloek the land ascends gradually to Dobo gebergte.

Off the coast between Ngaru Baloek and Ngaru Teping, a steep, rocky point, with some rocks off it, 5½ miles eastward, the depths are moderate, the 100-fathom ($182^{m}9$) line running about 2 miles offshore until near Ngaru Teping, where it approaches to within 6 cables; anchorage may be obtained by vessels with local knowledge in the western and middle parts of the bight between these two points. About three-quarters of a mile north-eastward of Ngaru Baloek a sandy beach begins, with some large rocks on it in places, and landing can be effected here when the sea or swell are not too heavy. From the beach the land rises gradually to the comparatively low ridges eastward of Dobo gebergte, and a road leads across to Geliting, on the north coast to Flores.

Eastward of Ngaru Teping (*Lat. 8° 45′ S., Long. 122° 23′ E.*) there is again a sandy beach, but landing cannot be effected here as the coastal reef extends about 2 cables offshore. About 1½ miles eastward of Ngaru Teping the coast becomes steep, rocky, and inaccessible, rising inland to Egon, an active volcano, 5,582 feet ($1,701^{m}4$) high, with a prominent cone on the northern side of the crater, 3½ miles northward of Ngaru To-oe (To-u), situated 5¾ miles eastward of Ngaru Teping.

Ngaru To-oe can be identified from a considerable distance by two hills, named together Batu Gaäk, rising within the point; the southern of these is a regular, conical, partly wooded hill, standing out plainly. Ngaru Kelahi, 4½ miles east-north-eastward of Ngaru To-oe, is the extremity of a steep spur, and can be identified from seaward by two white vertical rocks, one above the other; a small islet or rock lies close under the coast about midway between these two points, and the rocky cliffs here are of a whitish colour.

Between Ngaru Kelahi and Tanjong Toeak (Tuak), 12 miles east-north-eastward, the coast forms two bights, separated by Ngaru Koear (Kuar); the western bight is named Telok Roen (Run), and there is a sandy beach along the greater part of its shore, the land behind rising gradually, except in the north-eastern part, where there is a steep ridge, named Karkonata, vertical in places and probably the remains of an old volcano, close to the coast. Ngaru Koear, 5½ miles north-eastward of Ngaru Kelahi, is the extremity of a spur from this ridge; off the point, and separated from it by a narrow cleft, is a rock in the form of a sugarloaf, and on the eastern side of the point is a noticeable white patch.

The shore of the eastern bight also consists mainly of sandy beaches, occasionally interspersed by rocky points. Tanjong Toeak, the eastern entrance point of the bight, is a rather low, rocky point, with a very prominent, bare hill, 448 feet ($136^{m}5$) high, on its western side; it is a good landmark from all directions.

Charts 942a, 2759a.

Chart 1697.

The depths in both these bights are convenient for anchoring, but vessels should take care to avoid a large reef, with a least depth of 5 feet (1^m5) over it, lying about 6 cables offshore in the eastern part of the eastern bight; there are depths of from 11 to 15 fathoms (20^m1 to 27^m4) between this reef and the shore, but vessels from westward should not attempt to pass within this reef.

Charts 2776, 1697.

At the south-eastern extremity of Flores are the two Lobetobi mountains, both active volcanoes. The south-eastern, named Lobetobi Perampoean (Perampuan), has a broad summit, 5,586 feet ($1{,}702^m6$) high, about 3¼ miles northward of Tanjong Lirang, situated about 3½ miles east-north-eastward of Tanjong Toeak. Lobetobi Laki Laki, about 1½ miles north-north-westward of Lobetobi Perampoean, has a sharp peak 5,212 feet ($1{,}588^m9$) high. Daraloëng, 7¾ miles westward of Lobetobi Perampoean, is 4,739 feet ($1{,}444^m5$) high, and can easily be identified by its fairly regular shape.

Charts 1696, 1697.

NORTHERN SIDE OF FLORES.—The north coast of Flores is irregular, with numerous projecting points and inlets, many of which afford good anchorage during one of the monsoons, and a few of them are sheltered from both. Although in some places detached dangers lie some distance from the coast, they are all inside the 100-fathom (182^m9) line except Gosong Boni (*Lat. 8° 22′ S., Long. 122° 14′ E.*); the reefs are nearly always marked by discoloration, but they are generally so steep-to that sounding gives no warning.

The coast generally rises rapidly to high mountainous land, with only a few large plains, such as that round Bocht van Maoemeré (page 294), and the still larger plain of Lapeh, across which the central mountains of Flores can be seen far inland, almost to the foot of Amboe Romboe (page 278) and Iné Rié (page 277), near the south coast.

The coast, on the whole, is sparsely populated, and the only important settlements are in Telok Reo (page 286), Labuan Potah (page 287), and Bocht van Maumeré; the natives, who are agriculturists, dwell almost entirely inland on the slopes of the mountains, and seldom descend to the coast.

Currents and tidal streams.—Northward of Flores, at some distance from the coast, the stream follows the direction of the prevailing monsoon and may attain a rate of one knot. In December to May the current is east-going; during June to October it is west-going. November is a transitional month, with more southerly sets. This, however, is not an invariable rule, as during the South-east monsoon of 1908, in July and October, an east-going stream, with a maximum rate of 2 knots, was observed for days together in the vicinity of Soekoer (page 297). Towards the end of the North-west monsoon in March and April, 1931, a continuous set of from 2½ to 3 knots in a north-easterly direction was experienced for a week in a position about 20 miles north-north-eastward of Soekoer. Close off the coast the tidal streams are generally weak and variable.

Chart 1696.

Coast.—Dangers.—The bay entered between Seraja besar (page 265) and Gili Bodo, 8½ miles eastward, is encumbered by numerous reefs, as is also the approach northward of it close inside the 100-fathom

Charts 941b, 942a, 2759a.

Charts 1696.

(182^{m}9) line. Telok Rangkoh and Telok Boleh, at the head of this bay, are separated from each other by a steep point, 611 feet (186^{m}3) high. Rangkoh village stands on the south-eastern side of Telok Rangkoh, and consists of two parts about one mile apart. In the middle of Telok Boleh is Boleh, an islet, which appears dark against the land behind; the small village of the same name stands on its southern side. A chain of mountains extends southward from Toro Pontianah, the point southward of Gili Bodo, around the head of Telok Boleh, and terminates in a flat summit, 2,510 feet (765^{m}0) high, situated 2½ miles southward of the head of that bay; the other two summits in this chain, 1,956 feet and 1,414 feet (596^{m}2 and 431^{m}0) high, respectively, are only noticeable from westward, but a hill on Toro Pontianah, 942 feet (287^{m}1) high, is noticeable from both eastward and westward.

Gili Bodo slopes down gradually on the northern side from a hill 448 feet (136^{m}6) high, and is covered with grass and a few trees. Selat Gili Bodo, the passage between Gili Bodo and Toro Pontianah, is about 4 cables wide and clear of dangers, with depths of from 16 to 22 fathoms (29^{m}3 to 40^{m}2).

The reefs off this part of the coast are too numerous to describe in detail, and the chart should be referred to. An almost continuous chain of dangerous reefs runs just within the 100-fathom (182^{m}9) line from about 5 miles north-eastward of Seraja besar to Longgo, an island, 14 miles eastward and on the eastern side of the entrance to Telok Térang. A small patch of sand, coral, and stones, always above water, lies on a reef about 2 miles northward of Gili Bodo (*Lat. 8° 21′ S., Long. 120° 02′ E.*) and is a useful mark.

Charts 3756, 1696.

Anchorages.—Directions.—The northern extremity of Sabolan besar in line with the north-western extremity of Seraja besar, bearing 246°, leads north-westward of the reefs extending from the north-eastern extremity of Seraja besar, and also north-westward of the long chain of reefs near the 100-fathom (182^{m}9) line northward of Gili Bodo; Sabolan kechil should thus always be seen open northward of Seraja besar.

If anchoring eastward of Seraja besar the above alignment should be held, when approaching from eastward, until the south-western side of Boleh islet bears 155°, which bearing leads just clear of the westernmost reef of the ridge near the 100-fathom (182^{m}9) line, with a depth of 3¼ fathoms (5^{m}9) over it; this reef is scarcely ever marked by discoloration, although those lying eastward of it are generally visible.

Chart 1696.

If bound for Telok Boleh a vessel should follow these directions, passing westward of the 3¼-fathom (5^{m}9) patch at the western end of the ridge, and then steer for the western side of Boleh, bearing 156°, which leads into the bay between the reefs. During the survey, in 1906, there were three white patches on the slopes of the mountains southward of Boleh; the highest and easternmost of these was in line with the western side of Boleh, when approaching on this bearing. The vessel will have passed the 3¼-fathom (5^{m}9) patch, mentioned above, when the summit of Sabajor besar (page 263) bears about 236°, and is open south-eastward of the south-eastern extremity of Seraja besar.

Charts 941b, 942a, 2759a.

Chart 1696.

Anchorage may be obtained by vessels with local knowledge in a depth of 9 fathoms (16^{m}5), mud, southward of Boleh village, but the passage westward of Boleh eilandje should be taken, as the eastern passage is obstructed by reefs; vessels should take care, however, to avoid a small reef, which dries, lying close south-westward of the islet. There is also a small reef half a mile south-eastward of the islet, not marked by discoloration.

A vessel intending to pass through Selat Gili Bodo should proceed as previously directed for Telok Boleh, steering for the western side of Boleh islet, bearing 156°, until Toro Pontianah and Toro Lehok Tjamba, the western entrance point of Telok Térang, about 3¼ miles eastward, are in line, bearing 084°, when she should proceed on this latter alignment until near the entrance to the strait, which can then be navigated by eye. There is a small settlement on the coast eastward of Pontianah, and also on the southern side of Meda, a wooded islet about 100 feet (30^{m}5) high, in the inlet between Tanjong Pontianah and Toro Lehok Tjamba.

Chart 895, plan of Telok Terang.

Telok Térang.—Telok Térang, entered between Toro Lehok Tjamba (Chamba) and Toro Tjarmi (Charmi), about 3 miles north-eastward, is clear of dangers except in the southern part, where there are several reefs, which dry, usually marked by discoloration when covered. The reefs extending from Toro Lehok Tjamba and Toro Tjarmi (*Lat. 8° 21′ S., Long. 120° 08′ E.*) leave a passage only about 3 cables wide giving access to the bay. Longgo, a low, wooded island with a marshy coast, lies close northward of Toro Tjarmi; Toko Sari, a dark islet, about 60 feet (18^{m}3) high, lies on the drying reef about half a mile north-north-eastward of Toro Lehok Tjamba.

On the western side of Telok Térang are two inlets, separated from each other by Toro Pantah (Puntah), but they are of no importance to shipping. Nanga (Manga) Térang flows out at the head of the bay, which is to a great extent occupied by a mudbank, and the shores here are marshy; there is a small fishing village at the mouth of the river.

Telok Térang can be entered by eye between the drying reefs on either side of the narrow entrance; there is a patch of white sand, always above water, on the southern side of the reef on the western side of the entrance. Unless the reefs at the head of the bay are plainly visible, vessels should not bring Toro Pantah to bear more than 297°. The bottom is muddy throughout.

Telok Levilia and Telok Bari.—These two small bays lie close eastward of Longgo, and are separated from each other by a reef, which dries, extending 7½ cables north-westward from Toro Lodji (Loji); both bays are clear of dangers, in the fairway and the bottom consists of mud, but Telok Bari is open to north-westerly winds. Telok Levilia affords anchorage, in a depth of 22 fathoms (40^{m}2), southward of the eastern extremity of Longgo; small vessels can anchor in the eastern part of Telok Bari, in a depth of 10 fathoms (18^{m}3).

Bari village is divided into two parts, one situated on the eastern shore of Telok Levilia, and the other on a small rivulet at the head of Telok Bari; provisions, such as bananas, eggs, and chickens, can be obtained here.

Tanjong Peta Bari, 2 miles north-north-eastward of Toro Batoe

Charts 941b, 942a, 2759a.

Chart 895, plan of Telok Terang.

(Batu) Londa, the north-eastern entrance point of Telok Bari, is a low, sandy point, with a noticeable white sandy patch, always above water, on the coastal reef 2 cables north-westward of it. Toro Batoe Londa is steep and rocky, but elsewhere the shores of both bays are low.

Chart 1696.

Coast.—Lehok Bolo, entered between Tanjong Peta Bari and Toro Goempoel (Gumpul), a steep point, 280 feet (85^{m}3) high, about 3¾ miles east-north-eastward, has a marshy shore in the western part, and a sandy beach in the eastern part; Nanga Gila flows out about midway between the two points. Between Toro Goempoel and Toro Besi, about 10 miles east-north-eastward, the coast is covered with mangroves in many places, with narrow spurs from the mountains descending steeply to the sea.

Toro Besi is the extremity of a plateau rising steeply from the sea to an elevation of 1,279 feet (389^{m}9), and is a very distinct landmark when navigating along this part of the coast. The whole of the coast between Tanjong Peta Bari and Toro Besi is fringed by a steep-to reef, the 10-fathom (18^{m}3) line running close outside it, and the 100-fathom (182^{m}9) line barely half a mile offshore; there are no dangers outside the 10-fathom (18^{m}3) line, but a 4¼-fathom (7^{m}8) patch lies just within it, off the north-western side of the promontory of Toro Besi (*Lat. 8° 14′ S., Long. 120° 26′ E.*).

A sharp peak, 1,979 feet (603^{m}2) high, about 3½ miles southward of Toro Goempoel, is noticeable, especially from north-westward. Zadelberg, 4,173 feet (1,272^{m}0) high, about 14 miles south-south-eastward of Toro Besi, shows only one summit when seen from north-westward, but from a north-easterly direction it appears as two sharp peaks.

Chart 2466, plan of Telok Reo and Telok Linggeh.

Telok Reo.—Lights.—Telok Reo is entered between the eastern side of the promontory of Toro Besi and Toro Loeboe (Lubu), a low point about 4¾ miles eastward. The western shore of the bay, as far as the rocky Toro Kadindi, situated about 2½ miles south-eastward of Toro Besi, rises steeply to the plateau of Toro Besi, and is bordered by a sandy beach; southward of Toro Kadindi, where there is a small bay named Telok Kadindi, the coast becomes flat. Nanga Reo discharges about midway between Telok Kadindi and Toro Loeboe, and the valley of the river is plainly visible from seaward, whilst the mouth may be identified by some large dead trees on the left bank; the river is nearly three-quarters of a cable wide at the mouth, and the sandy bar can be crossed by boats at high water, but within the river a good look-out should be kept for large rocks lying on the bed. The fairly large village of Reo can be reached by the river, but it is not visible from seaward; a Government official resides here.

Doro Toi, about three-quarters of a mile north-eastward of the mouth of Nanga Reo, is a noticeable hillock, 135 feet (41^{m}1) high, on a steep point, the land around being low; north-eastward of this point the shore is marshy. There is a small Buginese settlement on Toro Loeboe, and a high house in the midst of trees is noticeable.

There is a pier which extends across the coastal reef at the head of Telok Kadindi, but, in 1946, it was reported to be partially demolished, with a stranded wreck at its head. There are numerous rocks, which dry, about half a cable offshore.

Charts 941b, 942a, 2759a.

Chart 2466, plan of Telok Reo and Telok Linggeh.

Leading lights are occasionally exhibited, at elevations of 10 and 20 feet (3^{m}0 and 6^{m}1), respectively, from two beacons at the root of the pier; each beacon is surmounted by a white triangle. These lights in line bear 222°.

Anchorage may be obtained, in a depth of 12 fathoms (21^{m}9), mud, off the end of the pier, and in a depth of 25 fathoms (45^{m}7), south-eastward of Toro Kadindi; elsewhere in Telok Reo the anchorage is bad, as the 100-fathom (182^{m}9) line runs close to the shore. Small vessels can, however, anchor eastward of the mouth of Nanga Reo, but it should be borne in mind that the 3-fathom (5^{m}5) line lies about 2 cables offshore there. Vessels of the Koninklijke Paketvaart Maatschappij visit this place regularly.

Telok Linggeh.—Telok Linggeh, entered between Toro Loeboe and Tanjong Koeroe Badja (Kuru Baja), about 4 miles east-north-eastward, affords good anchorage for large vessels in the south-eastern part, in depths of from 22 to 30 fathoms (40^{m}2 to 54^{m}9), mud. In the south-western part of the bay is an inlet in the coastal reef, named Telok Baso, into which Nanga Baso flows; Nanga Linggeh flows out 1½ miles farther eastward, and both rivers afford water throughout the year. The shores of Telok Linggeh are low and marshy, with an occasional rocky part; at the mouths of the two rivers there are sandbanks in place of the coastal reef.

Tanjong Koeroe Badja (*Lat. 8° 15′ S., Long. 120° 36′ E.*) is a steep point, and there is a round-topped hill, 674 feet (205^{m}4) high, about 6 cables southward of it.

Chart 1696.

Coast.—The coast between Tanjong Koeroe Badja and Toro Barat, a low point 8½ miles south-eastward, is generally steep with occasional sandy beaches; southward of Toro Boö, a low, rocky point about midway between Tanjong Koeroe Badja and Toro Barat, there is a marshy strip. Nanga Ramah flows out about 1½ miles westward of Toro Barat; north-westward of this river the coast is rocky, and eastward it is marshy. Temporary anchorage can be obtained by vessels with local knowledge off the mouth of the river, in a depth of 26 fathoms (47^{m}5).

Chart 2466, plan of Labuan Potah.

Labuan Potah.—Labuan Potah, entered between Toro Barat and Toro Lari, a low point 2¾ miles eastward, affords anchorage for small vessels only, as the bottom is too steep for large vessels. The shore of the bay is bordered by a sandy beach, and several streams flow out, but they all dry in the South-east monsoon. Labuan Barat is a small bight on the western side of the bay, southward of Toro Barat. Potah village, where a few provisions can be obtained, is situated near the mouth of Nanga Potah, which flows into the eastern part of the bay.

The mountains lie some distance from the coast around Labuan Potah, but there are two round-topped hills, close together and 135 feet (41^{m}1) high, about one mile southward of Toro Lari; on a south-easterly bearing these hills can be easily identified against the background from a distance of 7 miles.

Charts 1696, 1697.

Coast.—Toro Roto, about 2½ miles eastward of Toro Lari, is formed by a broad spur from the mountains. About 5 miles south-eastward of this point is a prominent mountain with a sharp summit, 2,075 feet

Charts 1696, 1697.

($632^{m}5$) high; Olifantsberg, about 8 miles southward of Toro Roto, is 3,689 feet ($1{,}124^{m}4$) high, and bears some resemblance to an elephant.

Chart 1697.

Telok Nanga Loho and Labuan Koelamboe (Kulambu), 5 and 8 miles eastward of Toro Roto, respectively, are of little importance; both have narrow entrances, only about half a cable wide, but they can be easily distinguished from each other at some distance, as the former has low entrance points, while the latter has steep points. Within the entrances the shores of both bays are marshy, with rocky points here and there, formed by spurs from the mountains. The depth in the entrance channel to Telok Nanga Loho is 6 fathoms ($11^{m}0$), and that depth is maintained for a short distance within the bay; the depth in the entrance to Labuan Koelamboe is about 16 fathoms ($29^{m}3$), but the wide part at the head of the bay is shoal. A prominent, isolated hill, 133 feet ($40^{m}5$) high, is situated on the coast about midway between the two bays.

Chart 2466, plan of Riung bay.

Telok Damoe.—Toro Padang, 2¼ miles eastward of the entrance to Labuan Koelamboe, is the north-eastern extremity of an almost bare peninsula, which forms the western side of Telok Damoe (Damu), an inlet clear of dangers, affording sheltered anchorage but with considerable depths; the eastern side of this inlet is formed by reefs, which extend about 1¼ miles from the northern side of Oenteloeé (Untelué), leaving an entrance about 2 cables wide between them and the reef extending from the eastern side of Toro Padang. Borong and Pulau Doea (Dua) lie on drying portions of the reefs extending from the northern side of Oenteloeé. A narrow, winding passage, only available for boats at high water, runs between Oenteloeé and the main coast, and connects Telok Damoe with Rioeng baai.

Rioeng baai.—Rioeng (Riung) baai is bounded by Oenteloeé on the western side, and the islets Roeton (Ruton) and Tangil (*Lat. 8° 23′ S., Long. 121° 04′ E.*), lying on a large reef, on the eastern side; Batu Kolong lies on the reef extending about 5 cables from the eastern extremity of Oenteloeé. About 4 cables eastward of Tangil are the two Bampa eilandjes, joined together by a reef which dries; Tauer eilandje lies about 8½ cables eastward of Oost Bampa. All these islets consist of more or less bare rocky ground, with occasional sandy beaches, and are uninhabited. A chain of reefs lies near the 100-fathom ($182^{m}9$) line northward of these islets, and there are some detached reefs within a distance of 7 cables north-westward of Roeton, and a reef also lies 9 cables south-westward of that islet.

Rioeng baai affords sheltered anchorage in both monsoons, either in the outer roadstead or in the inner bay, between the islets Babadjié (Babajié) and Pata, situated close offshore about 1½ miles southward of Batu Kolong; the inner anchorage is, however, very confined and is only suitable for small vessels. A rivulet discharges at the head of this inner bay.

Chart 1697.

Rioeng, a deserted village, stands on the crest of a ridge of mountains about 2 miles southward of the bay, at an elevation of 1,818 feet ($554^{m}1$); the position of the village can be identified from seaward by some weather-beaten trees on the summit. About 7 cables north-westward of the village is Wolo Watoe (Watu), 1,762 feet ($537^{m}1$) high,

Charts 941b, 942a, 2759a.

Chart 1697.

which forms the north-western end of the ridge; Wangka, 3,632 feet (1,107^{m}1) high and the highest summit of this ridge, lies 6 miles south-eastward of Wolo Watoe and has some large white patches on its south-eastern slope.

Chart 2466, plan of Riung bay.

Directions.—For entering Rioeng baai the small islets Gong, Pata, and Soei (Sui), situated close off the southern shore, are good marks; Gong, 3½ cables northward of Babadjié, is a bare, rocky islet; Pata is conical, with a couple of trees on its summit; and Soei, 1½ miles eastward of Pata, is a round rock covered with vegetation.

A vessel approaching from westward should steer for Roeton, bearing 146°, taking care that the steep south-western side of this islet is not open of the steep north-eastern side of Tangil. When Pata bears 201° and is open eastward of the 1,818-foot (554^{m}1) summit, on which Rioeng village stands, she should steer for it on that bearing, and anchor in a depth of about 28 fathoms (51^{m}2) when Toro Padang is in line with, or has just disappeared behind Tanjong Simpang Soea (Sua), the north-eastern extremity of Oenteloeé, bearing about 308°. If anchoring in the inner bay she should continue to steer for Pata until Babadjié bears 230°, thence steering by eye between the drying reefs, which are marked by discoloration, extending from Pata and Laindjawa (Lainjawa), about 4½ cables north-north-westward, and anchoring midway between Babadjié and Pata, in a depth of about 15 fathoms (27^{m}4), mud.

Charts 2466, plan of Riung bay, 1697.

Approaching from eastward, Pulau Doea (*Lat. 8° 22′ S., Long. 121° 01′ E.*) should not bear more than 270°; when Pata bears 201° the vessel should follow the directions given above. There is also a passage, about 6 cables wide, between the outer reefs eastward of Tauer, with Tado, a prominent mountain 2,776 feet (846^{m}2) high, situated about 4 miles eastward of Rioeng village, bearing 213°; thence the vessel should proceed by eye southward of Tauer and between Oost Bampa and Médja (Méja), an islet about 4½ cables south-eastward.

Chart 1697.

Coast.—The coast between Tanjong Torieng, about 11 miles east-south-eastward of Toro Padang, and Tanjong Nbai, 10½ miles farther in the same direction, is generally low and wooded; Pangsar, a rocky islet, lies close offshore north-westward of Tanjong Torieng; near Tanjong Lansie, 2 miles east-south-eastward of Tanjong Torieng, a ridge of hills slopes down close to the coast. About 6½ cables within the coast about 7 miles east-south-eastward of Tanjong Torieng is a very prominent, rocky, rugged hill, 824 feet (251^{m}1) high, named Liang; about 1¼ miles east-north-eastward of Liang is a bare, isolated hill with two summits, 499 feet (152^{m}1) high, named Batu Ndoa besar; Batu Ndoa kechil is a noticeable rock on the coast one mile east-north-eastward.

Between Tanjong Nbai and Tanjong Lambo, about 6½ miles south-eastward, the coast is bordered by a continuous sandy beach; inland is the extensive plain of Lapeh, behind which can be seen the massive volcanoes Amboe Romboe (page 278) and Iné Rié, as well as other high mountains on the southern side of Flores. Through this plain flows Nanga Koli, a comparatively large river, which forms a delta between

Charts 942a, 2759a.

Chart 1697.

Tanjong Nbai and Tanjong Lapeh, about one mile south-south-eastward; about one mile southward of Tanjong Lapeh is a noticeable hillock, 132 feet (40^{m}2) high, close to the coast.

Eastward of Tanjong Lambo, the character of the coast changes, becoming rocky with occasional small sandy beaches, with mountains inland; several prominent points form deep bays between, which usually have a strip of marshy land at the head. There are no important villages along this part of the coast, but an occasional small hamlet may be seen.

Several noticeable mountains lie eastward of the plain of Lapeh, and, when seen from seaward, appear to terminate westward in the conical peak of Lambo, about 10 miles southward of Tanjong Nbai and 4,495 feet (1,370^{m}1) high. About 5 miles eastward of this peak is a ridge with three prominent summits, the middle one, 3,084 feet (940^{m}0) high, being easily identified owing to its table-shaped top. Woro Paoe, 2½ miles south-westward of Tanjong Lambo and 2,333 feet (711^{m}0) high, is noticeable owing to its isolated position near the coast.

Off-lying dangers.—Between Tanjong Torieng and Tanjong Nbai the 100-fathom (182^{m}9) line lies about 3 miles from the coast, and a broken ridge of reefs lies just within it, terminating eastward in Pasir Rita, a low, sandy islet with low trees on it, fringed by a reef which dries, lying about 3 miles northward of Tanjong Nbai. Between this ridge of reefs and the coastal reef is a channel which can be used by vessels with local knowledge, although the water from the rivers makes it difficult to see the reefs, and frequently causes discoloration in places where there is deep water; the best passage through the outer reefs is westward of Pasir Rita, steering for Liang, bearing 231°, and thence proceeding westward by eye.

A reef, which dries, lies about 2½ miles offshore and about 5 miles south-eastward of Pasir Rita (*Lat. 8° 26′ S., Long. 121° 18′ E.*), but between these two there are no reefs along the 100-fathom (182^{m}9) line, although there are several some distance within it. From this drying reef there is an almost continuous chain of reefs along the 100-fathom (182^{m}9) line as far eastward as Tanjong Lolakota, a distance of about 17 miles; many of these reefs dry, and some have noticeable sandbanks on them, nearly always showing above water. The area within the 100-fathom (182^{m}9) line, from about 2 miles westward to 2 miles eastward of Tanjong Lambo, is practically unnavigable owing to the large number of reefs; thence eastward vessels with local knowledge can proceed, with careful navigation, within the outer reefs, although the narrow passage between Tanjong Lolakota and the reefs northward of it should not be attempted unless the reefs are plainly visible. In any case, none of these dangers should be approached within a depth of less than 10 fathoms (18^{m}3), as it is possible that the least depth over them was not found during the survey. Directions for the various passages through the outer reefs, leading to the bays along this part of the coast, are given on page 291.

Anchorage.—Good anchorage can be obtained by vessels with local knowledge off Tanjong Lapeh, probably fairly well sheltered in both monsoons, approaching with Amboe Romboe in line with the 132-foot (40^{m}2) high hillock one mile southward of Tanjong Lapeh, bearing 203°, and anchoring when within one mile of the hillock and 6 cables offshore, in a depth of 13 fathoms (23^{m}8), mud. The coast

Charts 942a, 2759a.

Chart 1697.

here can also be approached with the above hillock bearing 238°, which leads south-eastward of a reef, with a depth of one fathom ($1^{m}8$) over it, lying about 1½ miles east-north-eastward of Tanjong Lapeh.

Coast.—Todo baai, entered between a point about 1½ miles east-south-eastward of Tanjong Lambo and Tanjong Todo, a steep, rocky point, about 3½ miles farther eastward, although open, affords fair anchorage to vessels with local knowledge, as it is somewhat protected from the sea by numerous reefs, especially in the west monsoon; the bay is, however, a little difficult to enter. The shores are mostly marshy and covered with mangroves, here and there varied by a rocky point or a small sandy beach. The head of the bay consists of a marshy lagoon with a steep, rocky islet in the middle of the entrance. The western entrance point of the bay is noticeable owing to the white limestone of which it is formed; two large rocks lie on a reef, which dries, off this point. About one mile southward of Tanjong Todo is a mountain, with a wide summit, 1,342 feet ($409^{m}0$) high.

Tjiendeh (Chiendeh) baai, entered between Tanjong Tjiendeh, 2¼ miles east-south-eastward of Tanjong Todo, and Tanjong Kaboeria, nearly 2 miles farther in the same direction, is more spacious than Todo baai, and although open to northerly winds, affords safe anchorage to vessels with local knowledge in both monsoons. Tjiendeh, a bare, rocky islet, 292 feet ($89^{m}0$) high, lies about half a mile northward of Tanjong Tjiendeh; nearly 2 miles south-westward of this point is a mountain with a sharp peak, 1,834 feet ($559^{m}0$) high. Tanjong Kaboeria may be identified by the white limestone point 5 cables southward of it. Two reefs, the south-eastern of which has a depth of less than 6 feet ($1^{m}8$) over it, lie in the middle of the entrance, but otherwise the bay is clear of dangers.

Gomo baai and Korokaili baai lie between Tanjong Kaboeria and Tanjong Korokaili (*Lat. 8° 32′ S., Long. 121° 34′ E.*), 4¾ miles north-eastward, but are too much encumbered by reefs to be of any use; the two small, rocky islets, Gomo and Korokaili, lie close off the south-western entrance points of these bays, respectively.

Sopoe (Sopu) baai, entered between Tanjong Korokaili and a point 3¾ miles north-north-eastward, affords anchorage for a vessel of moderate size at the head, sheltered from all winds except north-west. The eastern shore of the bay, eastward of Tanjong Korokaili, should not be approached within half a mile, on account of the coastal reef there, and a detached reef, with a depth of one fathom ($1^{m}8$) over it, lies about 8 cables farther northward on the same side of the bay. A small reef lies 3 cables off the western shore at the head of the bay; the water here is seldom clear, owing to the overflow from streams and swamps.

The tongue of land separating Korokaili baai and Sopoe baai is hilly; on the outer end are two hills close together, the outer one attaining an elevation of 637 feet ($194^{m}2$). Close south-eastward of these is a sharp summit, and thence a ridge extends nearly 1½ miles south-south-eastward, terminating in a rounded summit 1,178 feet ($359^{m}1$) high. About 3¾ miles south-eastward of the latter is Geli Soke, with a flat summit, 2,779 feet ($847^{m}1$) high.

Directions.—A vessel bound for Todo baai should steer for the sharp peak, 1,834 feet ($559^{m}0$) high, westward of Tjiendeh baai, bearing 158°, just open eastward of the 1,342-foot ($409^{m}0$) mountain one mile southward of Tanjong Todo; the rear summit of this leading line soon

Charts 942a, 2759a.

Chart 1697.

disappears, even before the vessel is between the outer reefs, but by that time a new mark can be chosen. She should continue on this bearing until the noticeable, white, western entrance point of the bay bears 236°, when she should steer for it on that bearing, and then for the rocky islet in the entrance of the lagoon when it bears 199°; the vessel can anchor on this latter bearing when within 8 or 6 cables of the islet, in depths of from 10 to 15 fathoms ($18^{m}3$ to $27^{m}4$), mud.

If making for Tjiendeh baai, she should steer for the noticeable white point 5 cables southward of Tanjong Kaboeria, bearing 174°, which leads about 3 cables eastward of a sandbank, which dries, lying nearly 2¾ miles northward of Tjiendeh islet; she should continue on this line of bearing until the northern side of Tjiendeh islet is in line with Tanjong Todo, bearing about 276°, when she should proceed into the bay, passing westward of the reefs lying off the entrance. The vessel can, after passing the drying sandbank 2¾ miles northward of Tjiendeh islet, proceed to Sopoe baai by steering for Tanjong Karterbileh, situated about 4½ miles north-eastward of Tanjong Korokaili, bearing 057°, which leads south-eastward of the outer reefs and clear of all dangers; the sharp, conical summit on the eastern side of the bay, bearing 140°, leads through the outer reefs. When the reefs are clearly visible the vessel can proceed from Sopoe baai to Korokaili, Gomo, or Tjiendeh, by rounding Tanjong Korokaili (*Lat. 8° 32′ S., Long. 121° 34′ E.*) fairly closely, passing between this point and a reef lying about 6 cables north-westward of it.

Outlying island.—Paloë or Radja, an island about 8½ miles north-north-eastward of Tanjong Karterbileh, rises to a flat, partly wooded summit, 2,868 feet ($874^{m}1$) high, and can be approached close to on all sides. On the north-western side there is a prominent steep mountain ridge close to the sea, with a small bay, Labuan Bokko, just southward of it. The south coast of the island is, on the whole, steeper and more wooded than the north coast.

There are numerous villages on the island; Magé, the largest and most important, is situated on the north coast. The inhabitants are noted throughout the north coast of Flores as being very capable seamen and traders.

There are great depths close to the coast all round the island, the 100-fathom ($182^{m}9$) line being nowhere more than 3 cables offshore, so there is little opportunity for anchoring; in calm weather vessels with local knowledge can anchor off the north coast, just north-westward of Magé village, in depths of from 30 to 40 fathoms ($54^{m}9$ to $73^{m}2$), about 1½ cables offshore and one cable from the coastal reef. In Labuan Bokko there is anchorage for vessels with local knowledge in the same depth, one cable offshore, though the bottom is so steep here that a hawser should be taken to the shore; the coastal reef projects a short distance from the northern side of this bay.

Coast.—The promontory terminating northward in Tanjong Karterbileh is mountainous, with wooded summits, although the spurs, which generally rise steeply from the sea, are more or less bare and rocky; Sopoe, about 2¾ miles southward of Tanjong Karterbileh, is a wooded, cupola-shaped mountain, 2,317 feet ($706^{m}2$) high.

Lolakota baai, immediately eastward of Tanjong Lolakota (page 290), is not recommended as an anchorage; the coastal reef extends half a mile offshore in places, and some detached reefs lie in the entrance.

Charts 942a, 2759a.

Chart 1697.

Nanga Roedjong (Rujong) baai, separated from Lolakota baai by a steep promontory situated about 1¼ miles south-eastward of Tanjong Lolakota, is clear of dangers, and affords anchorage to vessels with local knowledge nearly half a mile offshore, in depths of from 15 to 25 fathoms ($27^{m}4$ to $45^{m}7$), mud, although it is almost entirely open to both monsoons. At the head of this bay is a fairly long sandy beach, and there is a large plain behind, through which two small rivers flow. Mati is a rock lying on the reef extending a short distance from the eastern entrance point of the bay, situated about 5½ miles east-south-eastward of Tanjong Lolakota.

The coast between Mati and Tanjong Maoesambi, 3 miles eastward, is steep, rocky and wooded; several spurs from Mount Olo Moekoe (Muku), 3,006 feet ($916^{m}2$) high and situated about 2¼ miles south-south-eastward of Mati, descend to the sea. A ridge of reefs runs just within the 100-fathom ($182^{m}9$) line off the coast between Mati and Tanjong Ngaleboe (Ngalebu), 6½ miles eastward, and there are also several reefs nearer the coast.

Maoesambi (Mausambi) baai, immediately eastward of Tanjong Maoesambi, affords fairly sheltered anchorage to vessels with local knowledge in both monsoons. To reach the anchorage a vessel should steer for Tanjong Maoesambi (*Lat. 8° 30′ S., Long. 121° 47′ E.*), bearing 180°, and then pass about 2 cables eastward of this point, anchoring in a depth of about 20 fathoms ($36^{m}6$), mud, about 3 cables south-eastward of the point. A small reef, with a depth of 16 feet ($4^{m}9$) over it, lies about 6 cables eastward of Tanjong Maoesambi, and a reef, with a depth of 3 feet ($0^{m}9$) over it, lies about one mile eastward of the same point. When the reefs are plainly marked by discoloration vessels with local knowledge can pass between a 3-fathom ($5^{m}5$) reef, lying about 1¼ miles north-north-eastward of Tanjong Maoesambi, and a larger and shoaler reef, about one mile farther eastward. At the head of Maoesambi baai is a wide sandy beach with a plain behind, within which a ridge of hills runs in a north-easterly direction, terminating in Tanjong Ngaleboe; vessels should give this point a berth of one mile, keeping outside the 100-fathom ($182^{m}9$) line.

Dondo baai is entered between Tanjong Ngaleboe and Tanjong Batoe (Batu) Boga, 7¼ miles east-north-eastward. Eastward of Tanjong Ngaleboe there is a marshy, wooded plain, terminated eastward by wooded ridges from Mboeni (Mbuni), which has a rounded summit, 3,885 feet ($1{,}184^{m}1$) high, situated 4½ miles south-eastward of Tanjong Ngaleboe; eastward of these ridges there is again a wide plain, fronted by a sandy beach. Tanjong Batoe Boga is the extremity of a bare, rocky, hilly ridge; two islets, which are good landmarks from eastward or westward, lie on the coastal reef extending a short distance from this point, the largest having a couple of trees on its summit.

A few reefs lie in the western half of Dondo baai, but the eastern half is clear of dangers, except for the coastal reef, and the ridge of reefs along the 100-fathom ($182^{m}9$) line ceases altogether. Dondo village is situated in the eastern part of the bay, and there is good anchorage for vessels with local knowledge westward of the village, in a depth of 25 fathoms ($45^{m}7$), about 3 cables offshore.

On the eastern side of Tanjong Batoe Boga there is a small inlet which affords anchorage for vessels with local knowledge, in a depth of 40 fathoms ($73^{m}2$), with the eastern extremity of that point bearing

Charts 942a, 2759a.

Chart 1697.

334°, distant half a mile; when rounding Tanjong Batoe Boga it should be borne in mind that the coastal reef extends about 2 cables beyond the islets, and a rock, usually above water, lies on its edge.

Tanjong Batoe Manoek (Batu Manuk), 4 miles eastward of Tanjong Batoe Boga, is the termination of a high, bold promontory; a reef, with a least depth of 3¾ fathoms (6^{m}9) over it, lies close offshore about 2½ cables west-north-westward of the point. On the eastern side of the promontory there is a bay, much encumbered by reefs, although anchorage may be found by vessels with local knowledge in the northern part, eastward of Tanjong Batoe Manoek.

Eastward of Tanjong Nanga Délan, 7 miles south-eastward of Tanjong Batoe Manoek, the character of the coast changes, becoming low and sandy, with flat, wooded land behind. Kimangboleng, 5½ miles southward of Tanjong Nanga Délan, has a flat summit 4,741 feet (1,445^{m}1) high, and a ridge of mountains runs westward from it.

Unjuran reef, which dries, lies about 3½ miles north-north-eastward of Tanjong Nanga Délan (*Lat. 8° 32′ S., Long. 122° 06′ E.*), and from this reef a ridge of reefs runs just within the 100-fathom (182^{m}9) line nearly as far as Tanjong Titir, situated about 8¾ miles south-south-eastward.

Bocht van Maoemeré.—Bocht van Maoemeré (Maumeré bay) is entered between Tanjong Titir and Tanjong Pogong, 7 miles eastward. The shore of the bay is mostly low and sandy, with a wide plain extending some distance inland; the coastal reef is comparatively narrow, but in places detached reefs lie about half a mile offshore.

Southward of the bay, near the south coast of Flores, is Djelé (Jele) gebergte, 3,132 feet (954^{m}7) high, connected to Kimangboleng by a range of hills, from 800 to 900 feet (243^{m}8 to 274^{m}3) high; at the western end of Djelé gebergte is Ili Gai, 2,979 feet (908^{m}0) high and situated about 6½ miles southward of Tanjong Titir. Dobo gebergte, about 2½ miles eastward of Djelé gebergte, consists of three round summits of nearly equal elevation, about 2,600 feet (792^{m}5) high. About 5 miles east-north-eastward of Dobo gebergte are two sharp summits connected to each other by a deep saddle, named Mapi and Tara, and about 4 miles eastward of Mapi is the volcano Egon, with a bare, smoking summit. (*See* page 282.)

Chart 2466, plan of Maumeré road.

Reede Maoemeré.—Lights.—Maoemeré (Maumeré) is a large village situated in the western part of Maoemeré baai, about three-quarters of a mile southward of Tanjong Titir, and is the headquarters of a Government official. Maoemeré rivier flows through the middle of the village, but it dries entirely in the South-east monsoon. From seaward the place can be readily identified by the zinc roofs of some houses and sheds on the beach, and by Ili Gètan, a hill, 194 feet (59^{m}1) high, situated about three-quarters of a mile south-south-eastward of the village. There is a pier about 150 feet (45^{m}7) long, which was reported to be in a bad state of repair, in 1946, extending from the northern end of the village, with a stranded wreck at its head.

Leading lights are exhibited at Maoemeré, the front light from the pier-head and the rear light occasionally, at an elevation of 13 feet (4^{m}0), from a post at the root of the pier; these lights, in line bearing 258°, lead to the anchorage.

Charts 942a, 2759a.

Chart 2466, plan of Maumeré road.

The roadstead is bounded by the arc of a circle, drawn with a radius of about 5½ cables from the head of the pier.

There is a flagstaff about three-quarters of a cable south-eastward of the root of the pier, and about 1½ cables farther south-eastward are two isolated noticeable trees; about 1½ cables south-eastward of these trees are two more prominent trees, but from northward, only their tops are visible above an intervening coconut plantation.

A safe anchorage may be obtained, in a depth of 20 fathoms (36^{m}6), mud and sand, from 2 to 3 cables offshore, landing a hawser if necessary; the bottom rises steeply. The approach is made through a gap in the coastal reef, with the pier bearing 258°.

Small quantities of provisions can be obtained at Maoemeré and Geliting. The roadstead is visited by vessels of the Koninklijke Paketvaart Maatschappij.

Charts 2466, plan of Maumeré road, 1697.

Directions.—Approaching Reede Maoemeré from westward, after passing Tanjong Batoe Manoek (*Lat. 8° 26′ S., Long. 122° 02′ E.*) at a safe distance, the southern side of Paloë should be kept bearing less than 283° and well open northward of Tanjong Batoe Manoek, so as to pass northward of Unjuran reef. When past this reef a vessel should steer for Dobo, bearing 150°, until Ili Gai is in line with the western of the eastern pair of prominent trees, which will just be seen over the coconut plantation, bearing 178°; a prominent house on the beach, just eastward of this alignment, is a useful additional mark in case the tree is not readily identified.

Chart 2466, plan of Geliting road.

Reede Geliting.—Beacon.—The village of Geliting is situated about 4½ miles east-south-eastward of Maoemeré, the coast between being well populated, and there are several villages, Waiparé, about three-quarters of a mile westward of Geliting, being the principal. Geliting is under an independent Rajah, and has a brisk trade. There is a conspicuous tree on the eastern side of the village, with a white cross mark close northward of it. A beacon surmounted by a black ball marks a shoal which lies about 7 cables north-north-eastward of the tree.

Vessels can anchor off Geliting, from 2 to 3½ cables offshore, within the reefs, in depths of from 22 to 28 fathoms (40^{m}2 to 51^{m}2), mud. A small hump on the western side of Dobo gebergte in line with the conspicuous tree on the eastern side of the village, bearing 185°, leads to the anchorage, passing close eastward of a 5-fathom (9^{m}1) patch, and westward of the reef which dries, marked by a beacon. Vessels lie here very well in the South-east monsoon, and in the west monsoon the reefs afford some protection from the sea.

Chart 1697.

Coast.—The coast between Tanjong Pogong and Tanjong Darat, 11½ miles north-eastward, is low, generally wooded, with occasional sandy beaches, on which there are in many places a few huts; several streams flow out. Close behind the coast the land rises regularly to bare, hilly ridges, with mountains farther inland. There are some detached reefs, lying within half a mile of the coast, from about 5½ to 8 miles eastward of Tanjong Pogong, but the coastal reef is narrow.

Pedang village stands at the head of Pedang baai, a small cove about 4 miles south-eastward of Tanjong Darat. There is anchorage for

Charts 942a, 2759a.

Chart 1697.

vessels with local knowledge in Pedang baai, and also in the small bay one mile northward, in depths of from 20 to 30 fathoms ($36^{m}6$ to $54^{m}9$).

Tanjong Darat is low and covered with mangroves, but close behind the land rises to four prominent hills, the seaward one being covered with reeds and a few trees.

Off-lying islands.—Pulau Besar and some smaller islands lie close together on a shoal plateau westward of Tanjong Darat, and are high, rocky, and fringed by reefs. Pulau Besar is fringed by a reef extending from 3 to 4 cables offshore on the northern, western, and southern sides, with deep water close outside it. The summit of Pulau Besar, almost in the middle of the island, is 3,052 feet ($930^{m}2$) high, very noticeable, and joined by a deep saddle to a flat, lower elevation south-eastward. There are a few small villages on the island, and deer are fairly plentiful. Kabah eilanden lie close off the south-eastern extremity of the island.

Dambilah lies about 4 cables eastward of Pulau Besar. Parmahan, close northward of Dambilah, has a large village on it; Kondoh (*Lat. 8° 27′ S., Long. 122° 26′ E.*), a large rock, lies about one mile north-westward of Parmahan. Pangah Batang, close off the south-eastern extremity of Dambilah, is low except for a noticeable rock, covered with vegetation, in the middle; there is also a fairly large village on this island. Numerous reefs and rocks lie between these islands and Pulau Besar, although in places there are depths of 10 fathoms ($18^{m}3$) and more; anchorage is, however, impracticable without local knowledge. There is a passage between the reef extending eastward from Pulau Besar and that extending southward from Dambilah, which gives access to this basin. There is also a narrow passage immediately eastward of Kabah eilanden, which leads to Kodjah village, on the south-east coast of Pulau Besar. Unless the reefs are plainly visible, and a previous examination has been made, it is inadvisable to take a vessel through these passages.

Straat Pangah Batang, between Pangah Batang and Tanjong Darat, is half a mile wide between the coastal reefs on either side, which are generally plainly marked by discoloration, and is clear of dangers; a patch of sand, always above water, lies on the edge of the reef extending about 2 cables from Pangah Batang. The summit of Babi, bearing 027°, leads through the middle of the strait; the tidal streams may attain a rate of 3 or 4 knots.

Babi, an island, about 3¼ miles north-eastward of Dambilah, is wooded and steep, except on its southern side, where there is a low, flat point, with a village on it. A reef extends about half a mile from the north-western side of the island, and the 100-fathom ($182^{m}9$) line runs close along the edge.

Pamana and Pamana kechil are two wooded islands lying close together on a plateau about 4½ miles north-westward of Pulau Besar. Pamana has two flat, hilly ridges, 332 and 323 feet ($101^{m}2$ and $98^{m}4$) high, respectively; the valley between these two ridges is inhabited by people from Boné Raté (page 493), who exist by fishing, trading, and agriculture. Pamana kechil is a steep, rocky island, 243 feet ($74^{m}1$) high, with a low, sandy tongue of land at its western end; a reef, which dries, extends about 2½ cables northward from the eastern end of the island. The 100-fathom ($182^{m}9$) line runs close along the edge of the reef surrounding these islands, but on the southern side of Pamana there

Charts 942a, 2759a.

is a small bay affording fairly sheltered anchorage to vessels with local knowledge, in depths of from 25 to 30 fathoms (45^{m}7 to 54^{m}9), sand and coral, in about the middle of the line joining the two entrance points of the bay, and 2 cables from the coastal reef; a small 8-fathom (14^{m}6) patch lies just outside this line.

Gosong Boni, named Goenoeng Sari by the natives, lies about 2¼ miles south-westward of Pamana, and is an atoll, which dries in places, with depths of from 20 to 46 fathoms (36^{m}6 to 84^{m}1), white clay, in the lagoon. An opening, about 1½ cables wide, on the eastern side of the reef, gives access to the lagoon. The two southern points of Pamana in line, bearing about 090°, leads about 2 cables northward of this atoll.

Outlying island and shoal.—Eiland Soekoer (Sukur) or Roesa Linguette, about 17 miles north-westward of Pamana (*Lat. 8° 22′ S., Long. 122° 18′ E.*), has a prominent summit, 861 feet (262^{m}4) high, on its north-eastern side, probably the remains of an old crater; the western side of this peak descends very steeply to a fresh-water lake, about 2 cables in diameter, which is enclosed by low ridges. In the south-western part of the island is a hill 282 feet (85^{m}9) high, and northward of this hill the island is low and flat. The entire island is wooded, and uninhabited. There is a sandy beach along the west coast, and the east coast is rocky; the north and south coasts are alternately sandy and rocky. A rock, with a single tree on it, lies on the reef extending about 2 cables from the south-eastern extremity of the island.

A narrow coral ridge, with depths of from 14 to 26 fathoms (25^{m}6 to 47^{m}5) over it, extends for about 7 cables northward of the western part of the island, and anchorage can be obtained here by vessels with local knowledge, with the hill in the south-western part of the island bearing about 180°, and the peak in the eastern part, about 112°. There is better shelter in an inlet in the coastal reef in about the middle of the north coast of the island, in a depth of 35 fathoms (64^{m}0), coral, about three-quarters of a cable from the coastal reef and one cable offshore, with a stern hawser to the shore.

Angelica shoal, named Pasir Lajaran by the natives, lies about 21 miles north-north-eastward of Soekoer, and is a complete atoll with two basins; the reef dividing the lagoon has some very noticeable, large brown rocks in the middle, which dry about 3 feet (0^{m}9). There are some dry patches of coral sand on the outer edge of the surrounding reef, which is plainly marked by discoloration; one of these patches lies on the western extremity of the reef, and close north-eastward of it a small vessel with local knowledge can pass over the reef and anchor in the western basin, in depths of from 24 to 33 fathoms (43^{m}9 to 60^{m}4). The 100-fathom (182^{m}9) line runs close along the outer edge of the atoll.

Coast.—About 4½ miles north-eastward of Tanjong Darat is a wide valley, through which Nanga Gètè flows; the coast here is low, bordered by sandy beaches in places or covered with mangroves. Tanjong Watoe Woelan (Watu Wulan), about 9 miles north-eastward of Tanjong Darat, and Tanjong Bokan, 1¾ miles farther north-eastward, are high, rocky spurs from the mountains, but should not be approached nearer than 7 cables in order to avoid the coastal reef. Between Tanjong Bokan and Tanjong Bela, 6 miles eastward, the coast consists alternately of sandy beaches and mangroves, the land becoming high just within. There is a fairly noticeable mountain,

Chart 1697.

2,881 feet (878^{m}1) high, about 4 miles south-eastward of Tanjong Bokan; its eastern side is an almost vertical rock, and it is probably the remains of an old crater.

There is good anchorage for vessels with local knowledge, close westward of the mouth of Nanga Gèté, about 2 cables offshore, in depths of from 20 to 30 fathoms (36^{m}6 to 54^{m}9), mud and sand.

Chart 2776.

Wai Proeng (Prung) baai, entered about 1½ miles eastward of Tanjong Bela, affords anchorage to vessels with local knowledge in about the middle of the bay, in depths of from 20 to 40 fathoms (36^{m}6 to 73^{m}2), about 3½ cables offshore; the bottom is steep and irregular, and a reef, with a depth of 3 feet (0^{m}9) over it, lies about 2 cables offshore in the eastern part of the bay. Lobetobi (page 283), in the south-eastern part of Flores, can be seen through a valley at the head of the bay, and Konga (page 301) can also be seen across this low part.

Hading baai.—Hading baai, entered between Tanjong Woloe (Wolu) Dama, 6¼ miles north-eastward of Tanjong Bela (*Lat. 8° 21′ S., Long. 122° 44′ E.*), and Tanjong Belabatoeng (Belabatung), 4 miles northward, is deep and spacious; the shores are sparsely populated, the inhabitants mostly dwelling some distance inland. The southern side of the bay is backed by high, steep mountain land; Hedaka, 5¾ miles eastward of Tanjong Woloe Dama and 1½ miles inland, is a mountain, 2,855 feet (870^{m}2) high, separated from Waikrowa, 3,284 feet (1,001^{m}1) high, 2½ miles north-north-eastward, by a low part, over which a road runs from the former village Hading, now consisting only of a few huts at the foot of Waikrowa to Larantoeka (page 302). The mountains on the southern side of the bay are separated from those on the northern side by a low isthmus; amongst the latter are Koemarodo (Kumarodo) and Noebi (Nubi), each having two summits, situated about 9 miles east-north-eastward and north-north-eastward, respectively, of Tanjong Belabatoeng.

Except for the coastal reef, which projects a short distance in places, and some small detached reefs close offshore, the bay is entirely clear of dangers; the 100-fathom (182^{m}9) line runs about half a mile offshore. The only anchorage available to vessels with local knowledge is in the north-eastern part, northward of an inlet, in a depth of 25 fathoms (45^{m}7), about 1½ cables from the coastal reef.

Coast.—Tanjong Batoe Pajoeng (Batu Payung), 3½ miles westward of Tanjong Belabatoeng, is the south-western extremity of the peninsula forming the northern side of Hading baai, and is somewhat low and covered with trees; a conspicuous rock, in the form of a toadstool, lies close off this point.

The coast between Tanjong Batoe Pajoeng and Tanjong Kopondai, 12½ miles north-eastward, is fairly well cultivated and populated, although most of the dwellings are scattered about the land. The coastal reef only extends a short distance in a few places, and the 100-fathom (182^{m}9) line runs close along the coast. Anchorage may be obtained by vessels with local knowledge on either side of Tanjong Gedong, a high, rocky tongue of land about 1¼ miles west-south-westward of Tanjong Kopondai, in depths of from 25 to 30 fathoms (45^{m}7 to 54^{m}9), very close offshore; the bottom is very uneven.

Tanjong Kopondai or Flores head is a high, steep promontory, especially on the eastern side, which is a bare, rocky cliff dropping

Charts 942a, 2759a.

Chart 2776.

nearly vertically into the sea ; a flat conspicuous rock lies close off the point.

Local magnetic anomalies.—A local magnetic anomaly, causing violent oscillation of the compass card, was reported, in 1924, by s.s. *Helcion* to have been experienced northward and north-eastward of Tanjong Kopondai on the parallel of 8° 00′ S., between the meridians of 122° 54′ E., and 123° 15′ E.

A local magnetic anomaly was reported, in 1926, to have been experienced off the east coast of Flores, in approximately lat. 8° 11′ S., long. 123° 00′ E.

EASTERN SIDE OF FLORES.—Coast.—Karang wutun, 7½ miles south-eastward of Tanjong Kopondai (*Lat. 8° 04′ S., Long. 122° 52′ E.*), is a low, wooded point ; the coastal reef extends half a mile offshore here, and there are two sandbanks on it about 8 cables north-westward of the point, the southern and largest of which is always above water and can be seen from a considerable distance. Anchorage can be obtained north-westward of this coastal reef, about 4 cables from the sandbank above water, in a depth of about 18 fathoms ($32^{m}9$), with Karang wutun just open north-eastward of the sandbank ; the bottom consists of coral and is very irregular.

Off-lying islet.—Serbete or Pulau Mas, about 3 miles east-south-eastward of Karang wutun, is an islet with a sandy beach on the southern side ; the northern side is mostly rocky. It is surrounded by an extensive reef, extending east-south-eastward for 1¾ miles, which dries entirely at very low water in April and November ; on this reef are two sandbanks, the eastern of which, on the north-eastern extremity, is always above water and is an excellent mark. The channel westward of Serbete is deep and clear of dangers.

Coast.—About 4 miles southward of Karang wutun is a small inlet, named Moeloebahan (Mulubahan), which is, however, almost entirely filled by reefs ; the head of the inlet is a mangrove swamp. The isthmus here, across to Hading baai, is easily identified from eastward, and on the northern side of Moeloebahan there is a noticeable round hill, 886 feet ($270^{m}0$) high.

There is no anchorage northward of Moeloebahan, but between the southern point of this inlet and Tanjong Matangdoë (*Lat. 8° 17′ S., Long. 123° 01′ E.*), 5½ miles south-south-eastward, anchorage may be obtained, in depths of from 20 to 30 fathoms ($36^{m}6$ to $54^{m}9$), at a convenient distance from the coast ; the coast here is somewhat higher and steeper, and there are occasional small sandy beaches. The coastal reef, with shoal water outside it, extends about 6 cables eastward from Tanjong Matangdoë.

The south-east coast of Flores is described under Straat Flores on page 300.

Charts 1697, 942a, 2759a.

CHAPTER X

SOLOR AND ALOR EILANDEN, WITH ADJACENT ISLANDS AND PASSAGES

Chart 2776.

STRAAT FLORES.—Straat Flores, between the eastern end of Flores and the western sides of Adoenara (Adunara) and Solor, is deep throughout and practically free from dangers. The northern end of the strait, known as Nauw van Larantoeka (Larantuka Narrows), is entered between Tanjong Matangdoë (page 299) and Tanjong Pasir, 2 miles south-eastward. Tanjong Podoh (*Lat. 8° 21′ S., Long. 22° 58′ E.*), about 5½ miles south-south-westward of Tanjong Matangdoë, and Tanjong Prigi, about 2 miles south-eastward of Tanjong Podoh, are the southern entrance points of Nauw van Larantoeka. Owing to the strong tidal streams the Narrows are impracticable for steam vessels of low power, and for high-powered vessels great care is required; in the remainder of Straat Flores the tidal streams are not sufficiently strong to interfere with the passage of steam vessels.

The middle part of Straat Flores is wide, deep and clear of dangers; the 100-fathom (182^{m}9) line runs close to the shore on either side, so that anchorage can only be obtained in a few places. The southern part of the strait, known as Straat Lewotobi, is a clear straight passage. *See* views facing this page and page 301.

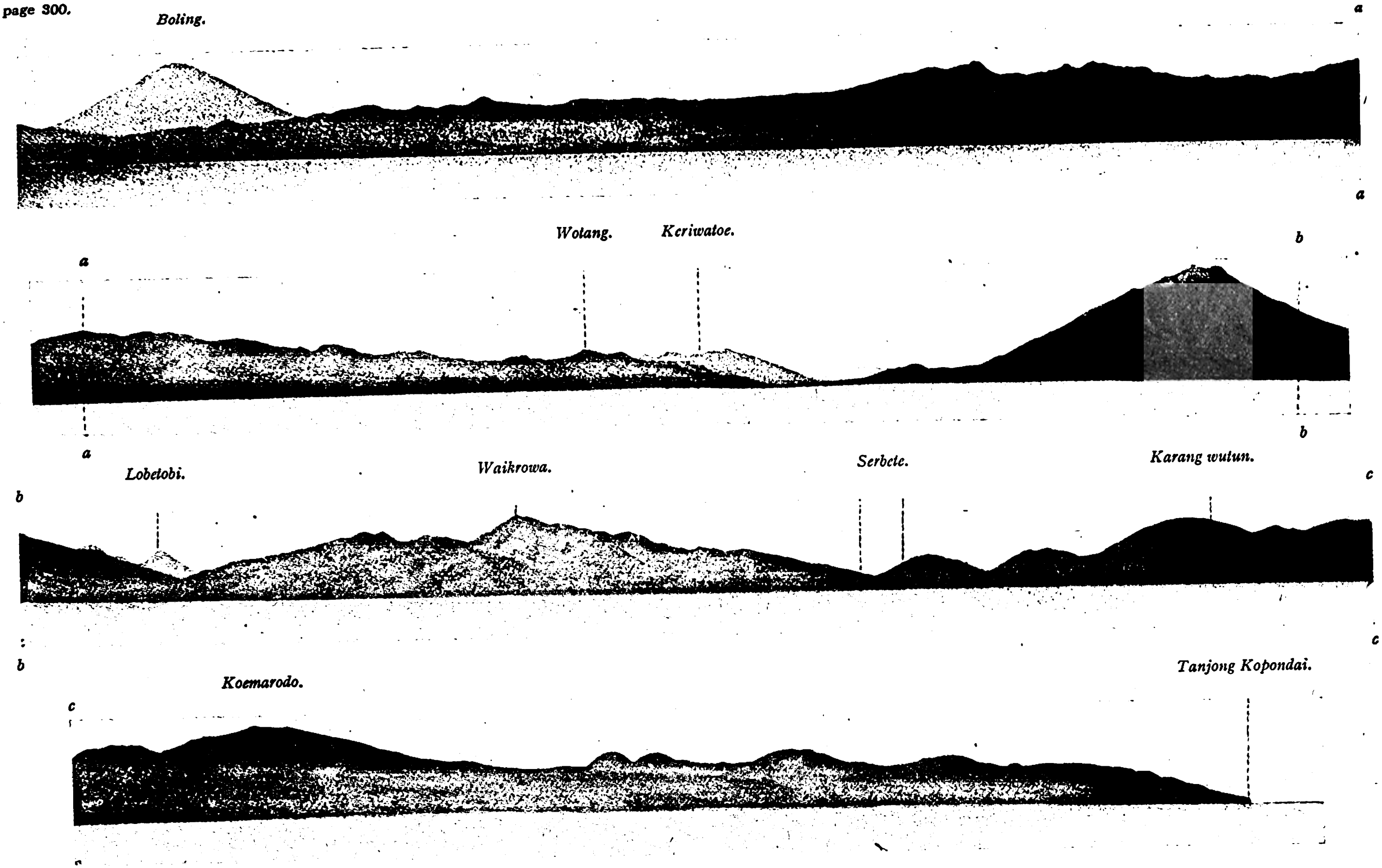
Climate and weather.—*See* page 17.

Coast.—The south-eastern coast of Flores between Tanjong Matangdoë and Larantoeka, 4 miles south-south-westward, is fringed by a sandy beach and rises gradually inland. Between Tanjong Serbete, about 2 miles southward of Tanjong Matangdoë, and Larantoeka there are many villages along the coast; there is a small church at Tengah, about one mile south-westward of Tanjong Serbete, but it is only visible from the wider part of Straat Flores. Ili Mandiri, about 3½ miles south-westward of Tanjong Matangdoë, is an extinct volcano with two summits, each about 4,925 feet (1,501^{m}1) high; a ridge runs down from the crater to Tanjong Matangdoë, rising near this point to Ili Sosah, which is 761 feet (232^{m}0) high, and a useful landmark when the higher mountains are obscured by clouds.

The west coast of Adoenara between Tanjong Pasir and Tanjong Wotang, about 7½ miles south-south-westward, is more rocky than the Flores coast on the opposite side of Nauw van Larantoeka, and the hills are more wooded; a reef extends about 2 cables from Tanjong

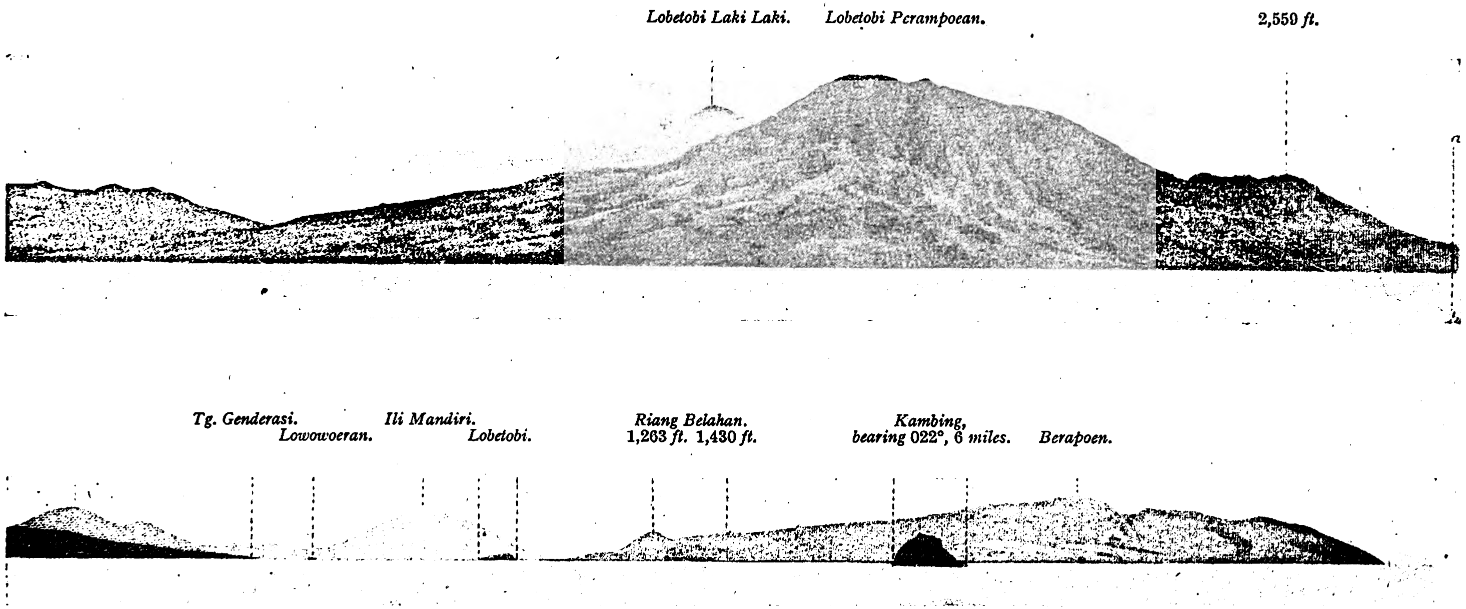
Charts 1697, 942a, 2759a.

To face page 300.



View, in four parts, of Nauw van Larantoeka, from 4 miles north-eastward of Serbete eilandje.
(Original dated prior to 1913.)

To face page 301.


Lobetobi Laki Laki.
Lobetobi Perampoean.
2,559 ft.
Tg. Genderasi.
Lowowoeran.
Ili Mandiri.
Lobetobi.
Riang Belahan.
1,263 ft. 1,430 ft.
Kambing,
bearing 022°, 6 miles.
Berapoen.

View, in two parts, of southern approach to Straat Lewotobi.

(*Original dated prior to* 1913.)

Chart 2776.

Pasir. Woeri (Wuri) village, situated half a mile south-south-westward of Tanjong Pasir, stands in a small plain and may be identified by its church. Tanjong Gonsalve, about 1¾ miles south-westward of Woeri, is a rocky point with some rocks lying close off it; between this point and Tanjong Oedang (Udang), one mile south-westward, the coast becomes steeper and the mountains approach closer to the coast, terminating in Wotang, 1,706 feet (520^m0) high, situated about three-quarters of a mile northward of Tanjong Wotang, the steep, rocky, south-western point of Adoenara and the northern point of the western entrance to Straat Solor.

On the western side of the middle part of Straat Flores, between Tanjong Podoh and Tanjong Wai Longa, nearly 13 miles south-westward, are two bays, separated from each other by a mountainous promontory named Kabalélo, 3,094 feet (943^m1) high. Wai Balon, a rocky islet sparsely covered with vegetation, lies about 8½ cables westward of Tanjong Podoh, and is separated from the coast by a narrow, navigable passage, with a depth of 10 fathoms (18^m3) in mid-channel; Wai Balon baai is entered about 1¼ miles north-westward of this islet. Tanjong Prigi, about 7½ miles south-westward of Tanjong Podoh, is the south-eastern extremity of Kabalélo promontory; about 8 cables northward of this point is a precipitous part of the coast, formed of reddish rock.

Chart 2466, plan of Konga bay.

Baai van Konga, on the southern side of Kabalélo promontory, is entered between Tanjong Lopez (*Lat. 8° 27′ S., Long. 122° 52′ E.*), about one mile west-south-westward of Tanjong Prigi, and Tanjong Wai Longa; it affords secure anchorage at the head, where the depths are moderate and there are no dangers, except for a reef fringing the western shore. Konga or Siang, an islet near the head of the bay, is covered with bushes; there are some well populated villages on the coast westward of this islet, also a small church. Vessels can anchor between the islet and the coast, in a depth of about 15 fathoms (27^m4), or northward and southward of the former. The south-western shore of the bay is generally low, rising gradually to the Lobetobi mountains.

Chart 2776.

About 2 miles south-south-eastward of Tanjong Wai Longa the Flores coast becomes steeper, forming rocky points with sandy beaches between.

The western side of Solor, forming the eastern side of the southern part of Straat Flores, consists of two groups of mountains, separated by a low plateau sparsely covered with palm trees; the northern group comprises Keriwatoe gebergte (Keriwatu), 2,920 feet (890^m0) high, and the southern group includes Riang Belahan and Berapoen (Berapun). The coast of the plateau is fringed by a sandy beach, behind which are steep cliffs about 30 feet (9^m1) high. Kalika wutun is the steep, rocky north-western extremity of Solor and the southern entrance point of the western end of Straat Solor, Tanjong Toelang (Tulang) Ikan, 2 miles south-westward of Kalika wutun (*Lat. 8° 26′ S., Long. 122° 59′ E.*), is low; about 2 miles farther southward there is a sandy beach, named Anatoeka (Anatuka); thence the cliff formation of the coast of the plateau begins. Lobang Batoe (Batu), about 1½ miles south-westward of the sandy beach, is a cleft in the rocky edge of the plateau, through which a small stream flows.

Chart 2776.

Tanjong Lewalingi, the south-western extremity of Solor, rises almost vertically to an elevation of 390 feet ($118^{m}9$), and is very noticeable owing to the reddish colour of the rock. Between Tanjong Lewalingi and Tanjong Lawawolo, about 1½ miles south-eastward, there is a wide sandy beach, the land behind being covered with reeds and palm trees; at Tanjong Lawawolo the sandy beach is interrupted by rocks, but then continues for a further mile eastward to Tanjong Toeak (Tuak), which may be identified by two palm trees standing on the extremity of the otherwise bare point.

For the description of the other coasts of Adoenara and Solar, *see* pages 304-311.

Islets and dangers.—Two reefs lie on the eastern side of the northern part of Nauw van Larantoeka; the northern of these lies north-westward of Woeri village and about 3 cables offshore, and has a depth of 1¼ fathoms ($2^{m}3$) over it; south-westward of this reef the 10-fathom ($18^{m}3$) line suddenly bends outwards, enclosing a shoal of coral and stones, with a least depth 4 fathoms ($7^{m}3$) over it, lying about 2 cables offshore.

A 5-fathom ($9^{m}1$) patch lies about half a mile offshore on the eastern side of the northern entrance to Straat Lewotobi, and a rock, which dries, lies about half a mile south-westward of Tanjong Lawawolo, on the eastern side of the southern entrance. A 22-fathom ($40^{m}2$) patch is charted outside the 100-fathom ($182^{m}9$) line, about 3½ miles south-south-westward of Tanjong Lawawolo, but efforts to locate it since it was reported have failed; no discoloration has been seen.

Four rocky islets, sparsely covered with vegetation, lie off the southern entrance to Straat Lewotobi. Kambing (*Lat. 8° 39′ S., Long. 122° 51′ E.*), the southernmost and largest of these, lies about 3 miles south-westward of Tanjong Lawawolo and is very steep, rising nearly everywhere vertically from the sea for the first 25 feet ($7^{m}6$); a narrow ridge of rocks extends a short distance from its south-eastern side. Noeha (Nuha) Lobetobi, about 2¼ miles northward of Kambing, is also steep and rocky, but is much lower and flatter on top. Noeha Lowowoeran (Nuha Lowowuran), about three-quarters of a mile west-south-westward of Noeha Lobetobi, and Laling, about 6 cables west-south-westward of Tanjong Lawawolo, are merely high rocks. Noeha Watoe (Nuha Watu), about 3 miles eastward of Kambing, is a very prominent rock with a sharp, white top, and two small rocks lie close to it.

Chart 2466, plan of Larantuka road.

Anchorages.—Light.—Larantoeka, situated on the western side of the southern entrance to Nauw van Larantoeka, is the seat of Government of East Flores and the Solor eilanden and is also the headquarters of the Roman Catholic mission.

There is a pier, about 150 feet ($45^{m}7$) long, which can be made as a landing place, but vessels cannot berth alongside it. The Custom house is situated on the south-western side of the pier, and there is a flagstaff on the head of the pier.

A light is exhibited, at an elevation of 15 feet ($4^{m}6$), from a post on the head of the pier.

Reede Larantoeka is bounded by lines drawn in 035° and 263° directions, to the coast, from a position in lat. 8° 20′ 50″ S., long. 122° 59′ 30″ E.

Charts 1697, 942a, 2759a.

Chart 2466, plan of Larantuka road.

A safe anchorage may be obtained, in a depth of 16 fathoms ($29^{m}3$), off the pier, about 2 cables offshore, or as far northward as Baroe (Baru) village. The tidal streams seldom exceed a rate of half a knot, and usually set north-eastward.

There is regular steamer communication with other ports in Flores and islands in the vicinity, and the village is connected to the general telegraph system.

Provisions can be obtained in small quantities, and good drinking water from a hydrant at the hospital, about 200 yards ($182^{m}9$) from the pier (*Lat. 8° 21′ S., Long. 122° 59′ E.*).

Chart 2776.

Wai Balon baai (page 301) affords good anchorage, in depths of from 10 to 20 fathoms ($18^{m}3$ to $36^{m}6$), from 1½ to 2 cables offshore.

Anchorage can be obtained off the south-western shore of Baai van Konga (page 301), in depths of from 20 to 30 fathoms ($36^{m}6$ to $54^{m}9$), from 1½ to 3 cables offshore, and also at the head of the bay.

Anchorage can be obtained under the west coast of Solor, southward of Tanjong Toelang Ikan; a good position, free from the influence of the tidal streams, is northward of Lobang Batoe, in depths of from 15 to 20 fathoms ($27^{m}4$ to $36^{m}6$), from 1½ to 2 cables offshore.

Tidal streams.—According to the natives, the north-going tidal stream, named "Wurah" by them, starts in Nauw van Larantoeka with the rising of the moon, and the south-going stream, named "Olah," six hours later, the changes recurring regularly. During the survey this theory was found to be fairly correct, with an average departure of one hour in the times given by the natives; it may be generally accepted that the north-going tidal stream begins one hour after the rising and setting of the moon, and the south-going stream six hours later. Slack water, especially during spring tides, is of very short duration. The maximum rate of the stream occurs from 2 to 3 days after full moon and new moon, when it may attain 9 knots; the lowest rate occurs from 2 to 3 days after the quarters, when it does not exceed 3½ knots. In Reede Larantoeka there is usually a north-going tidal stream, the average rate being one knot, and the maximum rate 2 knots; whenever there is a south-going stream in Nauw van Larantoeka an eddy may be expected in the roadstead, its strength, and also the distance it is felt from the shore, being influenced by the rate of the stream in the Narrows. In the wide part of Straat Flores only weak tidal streams were observed.

In Straat Lewotobi, the north-going tidal stream begins one hour after the rising and setting of the moon, as in Nauw van Larantoeka, the maximum rate observed being 5 knots, and it is strongest between Noeha Lobetobi and the Flores shore. When the surveying vessel was lying at anchor slightly eastward of the line joining Kambing and Noeha Lobetobi, and nearer the latter, the north-east-going stream predominated over the south-east-going stream in the proportion of 78 to 22.

Directions.—*From northward.*—In addition to Komba (chart 1697), an island lying about 45 miles north-eastward of Tanjong Matangdoë (page 299), the following marks are useful to vessels approaching Straat Flores from northward:—Noebi (page 298), with two summits separated by a shallow saddle, the southern being rounded, and the northern somewhat higher and steeper; Koemarodo, with two round

Charts 1697, 942a, 2759a.

Chart 2776.

summits of nearly equal elevation, also separated by a shallow saddle, about 4½ miles south-eastward of Noebi; the low isthmus by Moeloebahan (page 299), and the hill, 889 feet ($271^{m}0$) high, close northward of this inlet, are very prominent, especially from eastward, when the northern part of Flores appears as an island from a distance. In clear weather the Lobetobi mountains (page 283) are visible.

On Adoenara, Boling, a regular, extinct volcano, 5,443 feet ($1,659^{m}0$) high, in the south-eastern part of the island, with a large crater opening on its north-western side, is easily identified; about 4 miles north-westward and 7½ miles west-north-westward, respectively, are Koema (Kuma), 2,680 feet ($816^{m}9$) high, with an almost bare sharp peak, and Saboeri (Saburi), 3,248 feet ($990^{m}0$) high, with a blunt summit; about one mile south-eastward of Saganji wutun, the north-western point of the island, is Lamanoek (Lamanuk), a conical hill, 561 feet ($171^{m}0$) high, with a small wood on its summit.

Tanjong Serbete, on the western side of Nauw van Larantoeka, in line with Tanjong Oedang, on the eastern side, bearing 204°, or the Narrows just open, leads in clear of the reefs extending from Tanjong Matangdoë and Woeri village; when Woeri church bears 114° course can be altered southward, and the vessel can proceed in mid-channel.

The navigation of the middle part of Straat Flores and of Straat Lewotobi affords no difficulty. When abreast Larantoeka the two Lobetobi mountains will be seen, or, if they are obscured by clouds, a flat summit, 2,559 feet ($780^{m}0$) high, on the south-eastern slope of Lobetobi Perampoean (*Lat. 8° 33′ S., Long. 122° 47′ E.*), is a useful mark. On the eastern side of the strait are Wotang, a flat summit on the south-western point of Adoenara, and Keriwatoe, Riang Belahan, with two very flat summits, and Berapoen, on Solor.

From southward.—The 453-foot ($138^{m}1$) summit close within Tanjong Toeak (page 302), on the southern coast of Flores, the two Lobetobi mountains and the islets lying southward of Straat Lewotobi, particularly Kambing, are good marks for a vessel approaching from southward. Tanjong Lewalingi, on the eastern side of Straat Lewotobi, is a steep point of reddish rock. Tanjong Lirang, on the western side of the entrance, is the eastern of two noticeable rocky points.

SOLOR EILANDEN.—The Solor eilanden consist of the islands Adoenara, Solor, and Lomblen, and belong to the Residency of Timor and Dependencies. They are well populated, Adoenara having about 25,000 inhabitants, and Lomblen about 32,000. The coastal inhabitants of Adoenara are Muhammadans, except in the western parts, opposite Larantoeka, where there are some Christians; nearly the entire population of Lomblen is heathen, except in Lamarap, where there are some Roman Catholics, and Kalikoe (page 319) and Dololong which are chiefly Muhammadan.

The islands are on the whole very fertile, and the inhabitants live almost entirely by agriculture; the principal crop is sago, and rice in a lesser degree. There are coconut plantations everywhere. Pigs, goats, and poultry are plentiful, and deer abound on Solor and Lomblen, whilst horses graze on the strips nearer the coast. Trade is largely conducted by Chinese at Larantoeka.

Northern side of Adoenara.—Coast.—Anchorages.—The coast between Tanjong Pasir (page 300) and Saganji wutun, 7 miles north-

Charts 1697, 942a, 2759a.

Chart 2776.

eastward, is generally low and wooded, with occasional sandy beaches, the land behind rising gradually to the central mountains of the island.

Two detached reefs lie about 2 cables off Tanjong Ajer (Ayer), situated about 2½ miles north-eastward of Tanjong Pasir. Between Tanjong Ajer and Saganji wutun the coastal reef extends in places as much as 4 cables offshore, but has several gaps in it which afford good anchorage for praus; in one of these, about 8 cables north-eastward of Tanjong Ajer, there is shelter for small vessels with local knowledge, in depths of from 16 to 20 fathoms ($29^{m}3$ to $36^{m}6$), sand, from one to 2 cables outside the 3-fathom ($5^{m}5$) line. Adoenara (Adunara), a fortified village entirely surrounded by a heavy growth of cactus, is situated on a very steep, rocky hill about half a mile south-south-westward of Saganji wutun, and is easily identified by the zinc roof of its mosque; vessels with local knowledge can obtain anchorage off this village, in a depth of 30 fathoms ($54^{m}9$), about 1½ cables from the coastal reef, with Koema in line with the village, bearing about 147°, and Saganji wutun bearing 075°. Saganji wutun is a low salient ridge rising steeply from the sea for about 25 feet ($7^{m}6$); it should be given a berth of not less than 2 cables on account of its fringing reef.

Between Saganji wutun (*Lat. 8° 14′ S., Long. 123° 09′ E.*) and Horrong wutun, about 3½ miles eastward, there is a bight, which is encumbered by a narrow reef about 1½ miles long, with a least depth of one fathom ($1^{m}8$) over it at its western end, about midway between the two points. There is a deep channel between the eastern end of this reef and the eastern shore of the bight, but it is too narrow for anchorage. Anchorage may be obtained northward of this reef, in depths of from 25 to 30 fathoms ($45^{m}7$ to $54^{m}9$), but vessels should keep outside the line joining the two entrance points of the bight. Horrong wutun and Sagoe (Sagu) wutun, about 9 cables eastward, are the extremities of a moderately high promontory covered with reeds and a few scattered trees; the first-named point rises almost sheer from the sea, with off-lying boulders, and the latter is a narrow ridge with a slight rising at its outer end.

Chart 2468, plan of Sagu bay.

Sagoe baai.—Dangers.—Sagoe (Sagu) baai, entered between Sagoe wutun and Koli Kedeh wutun, about 1¼ miles eastward, affords moderately sheltered anchorage, the best on the north coast of Adoenara. The western shore is rocky in the northern part, but is sandy and covered with mangroves in the southern part, and also at the head of the bay; the eastern shore is steep and rocky. A plain runs some distance inland from the head of the bay, and is divided into two parts by a round hillock near the shore. A few small streams flow out, forming swampy land around them.

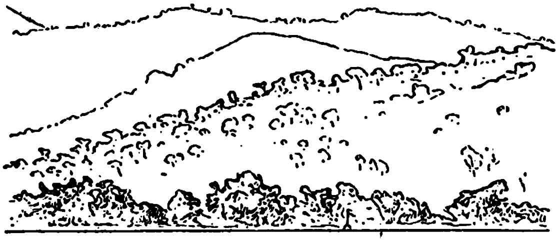
A 3¼-fathom ($5^{m}9$) patch lies about 8½ cables eastward of Sagoe wutun, and shoals, with depths of 5 and 4 fathoms ($9^{m}1$ and $7^{m}3$) over them, lie north-eastward of the patch. A reef, with a depth of 2½ fathoms ($4^{m}6$) near its outer end, extends half way across the bay from Tanjong Watoe (Watu) Koli, on the eastern side of the entrance, and southward of it are two patches with depths of 1¾ fathoms ($3^{m}2$) and 3 feet ($0^{m}9$) over them, respectively; a small reef, with a depth of 2 fathoms ($3^{m}7$) over it, lies in the south-western part of the bay.

Sagoe (Sagu) village, in the south-western corner of the bay, may be identified by the Rajah's house, built of stone, with a zinc roof, and a

Chart 2468, plan of Sagu bay.

flagstaff in front; close north-westward there is a monument on the beach, and there is a white stone pyramid at the head of the bay. Off the village there is an inlet in the coastal reef, affording good anchorage for praus. Fowls, eggs, fruit, goats, pigs, and water can be obtained at Sagoe.

Anchorages.—Directions.—To enter Sagoe baai a vessel should steer for the white pyramid at the head of the bay, bearing 176°, which leads clear between the reefs, anchoring when Koli Kedeh wutun bears 062°, in a depth of 24 fathoms ($43^{m}9$), sand, about 1½ cables from the reefs on either side. Small vessels can continue on this line of bearing and anchor in depths of from 17 to 19 fathoms ($31^{m}1$ to $34^{m}7$), mud, midway between the two reefs, with depths of 2 and 1¾ fathoms ($3^{m}7$ and $3^{m}2$), on the western and eastern sides, respectively, of the bay, and with Koli Kedeh wutun, bearing about 050°, just open north-westward of Tanjong Watoe Koli.



White pyramid, bearing 176°.

(*Original dated* 1933.)

The best landing place is by a prominent prau shed, with a large tree near it, eastward of the Rajah's house.

Chart 2776.

Coast.—Koli wutun, about 7 cables eastward of Koli Kedeh wutun (*Lat. 8° 14′ S., Long. 123° 14′ E.*), is rocky. A 7-fathom ($12^{m}8$) patch lies about half a mile east-north-eastward of Koli wutun. Between Koli wutun, and Tanjong Woeloe (Wulu) Wata, 3¾ miles east-south-eastward, there are three islets lying close offshore; Bani, 2¼ miles from Koli wutun, is 256 feet ($78^{m}0$) high, and the westernmost and largest; Merah, close south-eastward of Bani, is a reddish rocky mass, and Moekoe (Muku) lies half a mile westward of Tanjong Woeloe Wata. Mokko, a fishing village built on piles, standing in a depth of about one fathom ($1^{m}8$), is situated about one mile east-south-eastward of Tanjong Woeloe Wata.

Tanjong Woer Gobin, the north-eastern extremity of Adoenara, is a low, thickly wooded point, fringed with mangroves. Nearly the whole of this part of the coast is fronted by a chain of islets and reefs, lying close within the 100-fathom ($182^{m}9$) line, with a clear passage inside affording good anchorage, for which directions are given on page 307.

About one mile southward of Koli wutun are two round summits, 1,191 and 1,171 feet ($363^{m}0$ and $356^{m}9$) high, respectively, mostly covered with reeds. Lewokemieh gebergte, 1,939 feet ($591^{m}0$) high, lies in the north-eastern part of Adoenara, about 3½ miles westward of Tanjong Woer Gobin, and one of its peaks has a conspicuous tree on it;

Charts 1697, 942a, 2759a.

Chart 2776.

Néla, 1½ miles westward of Tanjong Woer Gobin, is a very prominent, conical, sparsely wooded hill, and two hills, 338 and 154 feet (103^{m}0 and 46^{m}9) high, lie about 8 cables westward and 5 cables south-westward, respectively, of the same point.

The east coast of Adoenara is described with Straat Boling, on page 311.

Off-lying islets and reefs.—Watoe (Watu) Peni, 115 feet (35^{m}0) high, and Kroko lie together on an extensive reef which partly dries, nearly 2 miles northward of Tanjong Woer Gobin; on the southern side of this reef is a very noticeable patch of white sand, which dries. Watoe Peni is rocky and covered with vegetation; Kroko is lower, smaller, and barer.

Ipet and Kenaweh lie about half a mile northward of Tanjong Woer Gobin, on another extensive reef, which almost entirely dries, and is separated from the first reef by a narrow passage with a least depth of 5 fathoms (9^{m}1); these two islets are moderately low and covered with vegetation, with mangroves around, except the western side of Kenaweh, which is rocky and bare. During the South-east monsoon there is usually a heavy surf on the northern and eastern sides of this reef; temporary anchorage, although entirely open, may be obtained off the north-eastern side, but it must be borne in mind that a ridge, with a depth of 4 fathoms (7^{m}3) over it, extends half a mile eastward from the northern extremity of the reef. Between the south-western side of the reef and the reef extending from Adoenara is a narrow passage, with a depth of 10 fathoms (18^{m}3) navigable for vessels with local knowledge.

Directions.—To proceed through the passage between the northern coast of Adoenara and the reefs northward, from westward, it is advisable to pass north-eastward of the 7-fathom (12^{m}8) reef lying half a mile east-north-eastward of Koli wutun, by keeping Néla in line with the north-eastern side of Bani islet (*Lat. 8° 15′ S., Long. 123° 17′ E.*), bearing about 131°; when Sagoe wutun has disappeared behind Koli wutun, bearing about 273°, course may be altered slightly eastward, taking care, however, to pass southward of a 4½-fathom (8^{m}2) reef, lying almost on the alignment of these two points and nearly 1¾ miles eastward of Koli wutun.

A vessel can proceed eastward from this inner passage, or she may enter it from eastward, by three different channels: westward of the reef surrounding Watoe Peni and Kroko; between that reef and the reef surrounding Kenaweh and Ipet; or between this latter reef and the Adoenara coast.

The passage westward of the Watoe Peni group has a least depth of 10 fathoms (18^{m}3) in the fairway, and is undoubtedly the best of the three, especially as the tidal streams are weak here; except in the vicinity of the south-western extremity of the reef surrounding Watoe Peni, which is steep-to, sounding is a good guide, and the western side of the channel should be held.

The middle passage is narrow and the depths irregular, but the drying parts of the reefs on either side are a good guide, particularly the white sandbank on the southern side of the reef surrounding Watoe Peni.

The third passage is very narrow, the sides are steep-to, and it should be navigated mainly by eye, but the reefs are usually plainly

Charts 1697, 942a, 2759a.

marked by discoloration ; owing to the strong tidal streams in Straat Boling, however, this passage cannot be recommended, especially from eastward. The summit of Watoe Peni seen between Kenaweh and Ipet, bearing 336°, leads into the entrance of this passage from Straat Boling.

Straat Solor.—Straat Solor, between Adoenara and Solor, is wide, deep, and entirely free from danger, except for a reef on the southern side of the eastern entrance ; the bottom throughout consists of black and white sand. The navigation of the strait is easy, and the strong tidal streams found in Nauw van Larantoeka and Straat Boling are not felt here. The depths are greater, and the bottom is steeper, under the Solor shore ; consequently, for anchorage purposes, the Adoenara side is preferable, although heavy squalls may be more frequent here owing to Adoenara being higher than Solor. The direction and force of the wind are considerably influenced by local circumstances, so that there may be a different wind blowing from that usually expected at any particular time of the year, and also differing from that blowing in the vicinity of the strait.

The only mountains on Adoenara which are noticeable from the strait are Wotang (page 301) and Pasen Daeng, 2,175 feet (663^{m}0) high, about 2 miles north-north-eastward. The mountains in Solor are described on page 310. The entire northern coast of Solor is sandy and stony, interspersed with trees, and, in contrast with the coast of Adoenara, is very unfertile.

Straat Solor is entered at its western end between Tanjong Wotang (page 300), and Kalika wutun, about 2 miles south-westward. The southern coast of Adoenara between Tanjong Wotang and Wéra wutun, a low prominent, wooded point, about 3½ miles eastward, is comparatively low and forms several small bays ; in Bani Ona, the eastern of these, there are some warm springs on the drying reef, and, when covered, the steam can be seen rising from them ; a small stream flows out here.

About half a mile eastward of Kalika wutun (*Lat. 8° 26′ S., Long. 122° 59′ E.*), is a small bay with a few huts along the shore, and praus may usually be seen at anchor there ; on the slopes above the bay are the fairly large villages Lewonama and Pamakajoe (Pamakayu). Pamakajoe wutun (Pamakayuwutun), on the eastern side of this bay, is steep and rocky, and forms the western entrance point of a bay which lies between it and Lewokaha wutun, about 2½ miles eastward. At the head of the bay, where there is a prominent rocky point, is the valley between Keriwatoe gebergte (page 301), on the west, and Lewoeoeng (Lewuung), on the east. The villages Pasar Angerèling and Kèbang are situated about 3½ cables south-south-westward and one mile eastward, respectively, of Lewokaha wutun, and about three-quarters of a mile farther eastward is the fairly large village Lewahadjong (Lewahajong), where there are the remains of an old fort built by the Portuguese in 1561. Menanga village is situated about one mile eastward of Lewahadjong, and behind it is a plateau descending steeply on the eastern side to a narrow inlet, at the head of which is a small river flowing through a cleft. Eastward of this cleft the land rises gradually to the mountains inland and is mostly covered with reeds.

Nearly the whole of the coastal strip on the northern side of the

Chart 2776.

strait between Wéra wutun and Trong village, about 4¾ miles east-north-eastward, is low and wooded, the land rising gradually behind; there are occasional sandy beaches varied by rocks and trees growing down to the edge of the water. Trong and Lamahala, close eastward, stand on two hilly ridges, and carry on a fairly brisk trade; a number of praus is usually seen at anchor here; the inhabitants of Lamahala are traders, fishermen, and workers in gold, silver, and iron.

Reede Wai Werang.—Light.—Wai Werang (Wareng) village is situated at the mouth of the river of the same name, which discharges close westward of Warang wutun, about one mile eastward of Lamahala.

There is a stone pier, at the root of which a light is occasionally exhibited, at an elevation of 22 feet ($6^{m}7$), from an iron column, 16 feet ($4^{m}9$) in height.

Reede Wai Werang is bounded by the meridian of Werang wutun, and by the arc of a circle, described with a radius of half a mile, from the head of the pier.

The roadstead is visited by vessels of the Koninklijke Paketvaart Maatschappij.

Coast.—Danger.—In addition to several villages along the southern coast of Adoenara, there are also market places, where markets are held on days fixed by the Government; the principal of these are Pasar Lamoe (Lamu), situated about 2¼ miles east-north-eastward of Tanjong Wotang, Pasar Benabang, about 2¼ miles east-north-eastward of Wéra wutun, and Wai Werang village, at all of which provisions, such as fowls, eggs, fish and fruit can be obtained.

The description of the southern coast of Adoenara farther eastward is continued on page 312.

Tanjong Kebon (*Lat. 8° 25′ S., Long. 123° 09′ E.*), on the southern side of the strait, about 4 miles eastward of Menanga village, is low, but ends abruptly with an overhanging cliff resembling the sail of a ship; the coast between this point and Tanjong Watoe Boekoe (Watu Buku), about half a mile south-eastward, is bare and rocky.

A long ridge, with a least depth of 2 fathoms ($3^{m}7$) over it, runs parallel with the coast and about half a mile offshore, off Tanjong Watoe Boekoe; there are depths of from 3 to 6 fathoms ($5^{m}5$ to $11^{m}0$) between this ridge and the coast.

Anchorages.—Anchorage can be obtained almost anywhere along the south coast of Adoenara, in depths of from 15 to 30 fathoms ($27^{m}4$ to $54^{m}9$), at convenient distances offshore.

Anchorage can be obtained almost everywhere off the north coast of Solor, in depths of from 20 to 35 fathoms ($36^{m}6$ to $64^{m}0$). There is very good anchorage in the bay between Pamakajoe wutun and Lewokaha wutun, with the rocky point at the head of the bay bearing about 127°; there is a depth of 30 fathoms ($54^{m}9$) about 3 cables from this point, and 15 fathoms ($27^{m}4$) one cable nearer the shore. There is anchorage, in a depth of 25 fathoms ($45^{m}7$), northward of the remains of an old Portuguese fort off Lewahadjong village, about 2 cables offshore.

Tidal streams.—During the short period occupied in the survey of Straat Solor it was observed that the tidal streams set eastward and westward, never attaining a rate of more than 1½ knots, and usually not more than one knot. The direction of the tidal stream is

Charts 1697, 942a, 2759a.

governed by the tidal streams setting at that time in the adjacent straits of Flores, Boling, and Lamakera, also by the vertical movement of the water in these straits.

Solor.—Aspect.—The mountains in the northern part of Solor are divided into three groups, the western named Keriwatoe, being separated from the Lewoeoeng mountains by a low valley. The Keriwatoe is the remains of an old crater, the southern side of which has fallen in. The highest summit of Lewoeoeng has an elevation of 2,894 feet (882^{m}1), and from this a ridge extends eastward, whilst half a mile north-westward is a summit 2,067 (630^{m}0) high, which may be identified by a small wood on it. The most noticeable summit of the eastern group is Manga, 1,526 feet (465^{m}1) high, with a wood on it, visible from all directions; close northward of Tanjong Kera, on the south coast, about 2¾ miles south-westward of Tanjong Mottong, the bare rocky eastern extremity of the island, is a steep mountain 1,398 feet (426^{m}1) high. The mountains in the south-western part of Solor have been described with Straat Flores on page 301.

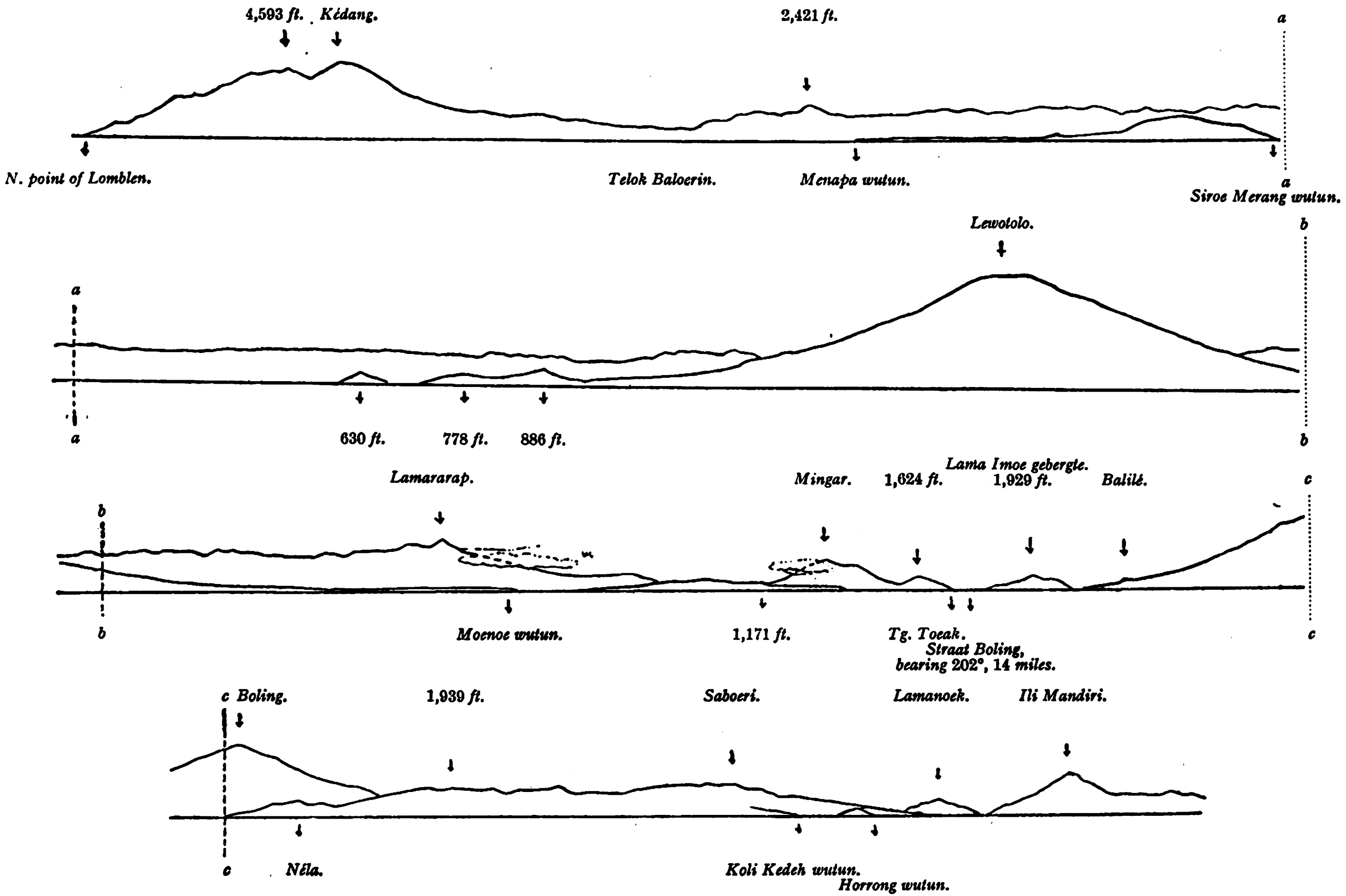
Reede Lamakera.—Reede Lamakera, situated close westward of Tanjong Mottong, affords safe anchorage out of the strong tidal streams to large vessels, in a depth of 11 or 12 fathoms (20^{m}1 or 21^{m}9), 2 cables offshore, with Tanjong Mottong in line with Tanjong Ipat, situated about 3 cables southward, bearing 184°, and Tanjong Watoe Boekoe in line with Tanjong Kebon, bearing about 297°. The 3-fathom (5^{m}5) line lies nearly one cable offshore off the village, with foul ground inside.

The village is bordered by a wide sandy beach. The inhabitants live almost entirely by fishing, including whaling, for which purpose they have an especial kind of prau. The red roof of the mosque, and the Rajah's flagstaff, with the road leading to it from the beach, are noticeable.

A vessel approaching the anchorage from north-westward can, by keeping close to the coast, carry a least depth of 4 fathoms (7^{m}3) in the channel between the 2-fathom (3^{m}7) ridge mentioned above and the coast. The wood on the summit of Manga in line with the point north-westward of the village, which can be identified by the white graves on it, bearing 238°, leads close south-eastward of the 2-fathom (3^{m}7) ridge, in a depth of 7 fathoms (12^{m}8), and Tanjong Mottong (*Lat. 8° 26′ S., Long. 123° 10′ E.*) in line with Tanjong Ipat, bearing 184°, leads eastward of it.

South-eastern side of Solor.—Anchorages.—The coast between Tanjong Mottong and Tanjong Kelettè, about 2 miles south-westward, is very steep and rocky, and this continues more or less to Tanjong Tobi, about 5¼ miles farther west-south-westward. Westward of Tanjong Tobi the coast forms a bight, with a long sandy beach at its head, and inland the low plain separating the Keriwatoe and Lewoeoeng ranges (*see* page 308). The southern part of the western shore of this bight is rocky, the land within rising to the slopes of Keriwatoe. Thence a sandy beach, broken in one part by the low, rocky Lian wutun, 6¼ miles south-westward of Tanjong Tobi, continues nearly to Samantanji wutun, about 2¼ miles south-south-westward, a low, bare, rocky point with some rocks off it; inland from this part of the coast is the plain of Likoe (Liku), covered with reeds and palm trees. Between Samantanji wutun and Tanjong Toeak (Tuak), about 4 miles

To face page 311.



View, in four parts, of Adoenara and Lomblen from northward.

(Original dated 1933.)

Chart 2776.

south-westward, the coast is steep and rocky, the land rising steeply within to the summit of Berapoen.

Anchorage can be obtained anywhere off the south-east coast of Solor as far southward as Samantanji wutun, and there is very good anchorage between this point and Lian wutun, bearing in mind that the coastal reef extends some distance offshore here. An isolated conical hill, 512 feet ($156^{m}1$) high, in the southern part of Likoe plain, is very prominent from south-eastward.

STRAAT BOLING AND STRAAT LAMAKERA.—These straits provide a spacious deep, and almost entirely clear passage between Adoenara and Solor on the western side, and Lomblen on the eastern side (*see* view facing this page). The straits are somewhat exposed and there is usually a stiff breeze, especially in the latter half of October and the months of November and December, when the prevailing wind is from south-west; with the wind from this direction there is also a considerable sea in Baai van Leba Leba. For these reasons, and also on account of the strong tidal streams (*see* page 313), Straat Flores is preferable, although Nauw van Larantoeka, owing to their lesser width and stronger tidal streams, are more difficult to navigate than Straat Boling.

The width in the northern part of Straat Boling is considerably reduced by the reefs, which partly dry, on either side, but these are generally clearly marked by discoloration, and the 20-fathom ($36^{m}6$) line runs close along their outer edges; there is a depth of about 90 fathoms ($164^{m}6$) in the middle of this strait. Anchorage is impracticable in Straat Boling, but, once through the narrows, anchorage can be obtained almost everywhere in Baai van Leba Leba, out of the influence of the strong tidal streams.

Straat Boling.—The east coast of Adoenara between Tanjong Woer Gobin (page 306) and Tanjong Watoe (Watu) Woko (*Lat. 8° 23′ S., Long. 123° 18′ E.*), the south-eastern extremity of the island is low and rises gradually to the hills and mountains within. The entire south-eastern part of the island is occupied by Boling, the extinct volcano (page 304), which rises regularly on all sides and is entirely detached from the other mountain land; the slopes are wooded, cultivated, and inhabited. On its south-eastern slope, about one mile north-westward of Tanjong Watoe Woko, is another cone, named Balilé, which is prominent from all directions. From Pasar Waiwoeri (Waiwuri), 2½ miles south-westward of Tanjong Woer Gobin, to Deri wutun, about 3 miles farther southward, the coast is bordered nearly throughout by a sandy beach; this part is well populated, and numerous roofs of dwellings will be seen amongst the coconut trees. Deri village is situated about one mile southward of Deri wutun, and from here the aspect of the coast changes, consisting of rocky points with off-lying rocks, and small inlets and sandy beaches between. Boling village, surrounded by stone walls and cactus, stands in one of these inlets, which affords a good landing place and anchorage for praus; there is a well here, from which the inhabitants of all the surrounding villages draw water. Southward of Deri wutun it is advisable to keep at least 3 cables offshore.

The eastern side of Straat Boling is formed by a relatively low peninsula at the north-western extremity of Lomblen; when seen

Charts 1697, 942a, 2759a.

from Straat Lamakera this peninsula has the appearance of a long, low island. Tanjong Wai Au, the northern extremity of this peninsula, is formed by a spur from an isolated hill, 492 feet (150^{m}0) high, one mile southward of the point. The coast between Tanjong Wai Au and Tanjong Toeak (Tuak), 5 miles south-westward, is low and covered with mangroves, varied here and there by a sandy beach, and fringed by a reef, which almost entirely dries, extending as much as 6 cables offshore. Tanjong Toeak is flat, overgrown with reeds and a few palms, and terminates in a steep, rocky cliff, about 17 feet (5^{m}2) high.

When making for Straat Boling from northward, Komba (chart 1697), about 30 miles north-north-eastward of the entrance, is a good mark; when closer in Kédang (chart 1697) and Lewotolo (page 317) in Lomblen, Boling in Adoenara, and Ili Mandiri (page 300) in Flores, are excellent landmarks. *See* view facing this page.

Baai van Leba Leba.—Baai van Leba Leba, entered between Tanjong Toeak and Tanjong Wai Wowang, about 5 miles south-eastward, has moderate depths and is to a great extent clear. The northern shore rises gradually to the low hills of the peninsula forming the eastern side of Straat Boling; at the head of the bay, and on the southern side, there is a plain at least 2 miles wide. Tanjong Wai Wowang may be identified by the high trees on it; the Wai Wowang discharges close south-westward of the point, but it is nearly dry in the South-east monsoon. Tanjong Geléko, about 3 miles east-north-eastward of Tanjong Wai Wowang, is wooded by high trees. The shores of the bay are sparsely populated, but there are a few settlements on the north-eastern side.

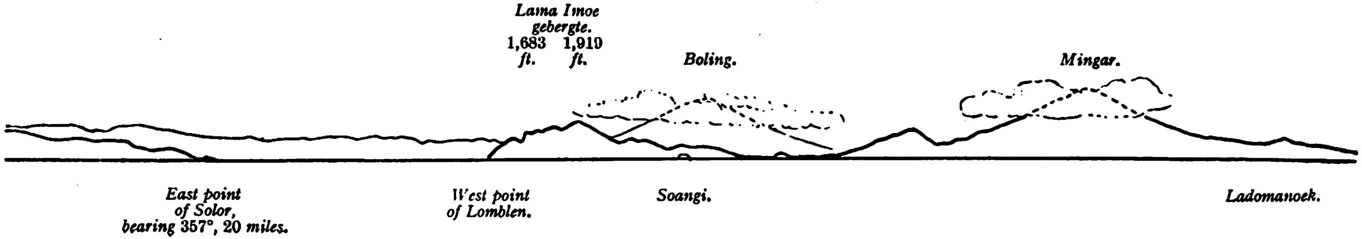
There are several dangers at the head of the bay, and the coastal reef extends as much as 6 cables offshore in places and is very irregular; as the water is not clear, great caution should be exercised when approaching within one mile of the shore. Awalolong rif, which dries, lies off the southern shore, about 1½ miles westward of Tanjong Geléko (*Lat. 8° 22′ S., Long. 123° 27′ E.*); there is a navigable passage, with depths of from 3¾ to 6 fathoms (6^{m}9 to 11^{m}0), between this reef and the shore, but a small reef, with a depth of one fathom (1^{m}8) over it, lies in the eastern part of it.

Owing to the moderate depths anchorage can be found nearly everywhere in the bay, and there is good shelter and little tidal stream within the line joining Nerin wutun, on the northern shore about 3 miles eastward of Tanjong Toeak, and Tanjong Wai Wowang. There is very good anchorage midway between Awawolong rif and the reef extending from Tanjong Geléko, in a depth of about 8 fathoms (14^{m}6), coral sand, with a patch of sand, which dries, on Awalolong rif in line with Boling, bearing about 275°.

The description of the west coast of Lomblen south-westward of Tanjong Wai Wowang is continued on page 313.

Straat Lamakera.—Dangers.—The south coast of Adoenara between Warang wutun (page 309) and Ana-boeraka wutun (Anaburaka wutun), 3¾ miles eastward, forms a bight, in which is a sandy beach and a much frequented market place, named Pasar Samara; anchorage can be obtained in this bight, but farther eastward the tidal streams are strong. Ana-boeraka wutun can be identified from eastward or westward by a ridge of black rocks extending from it, which should be given a berth of 2 cables. Pasar Longa is situated

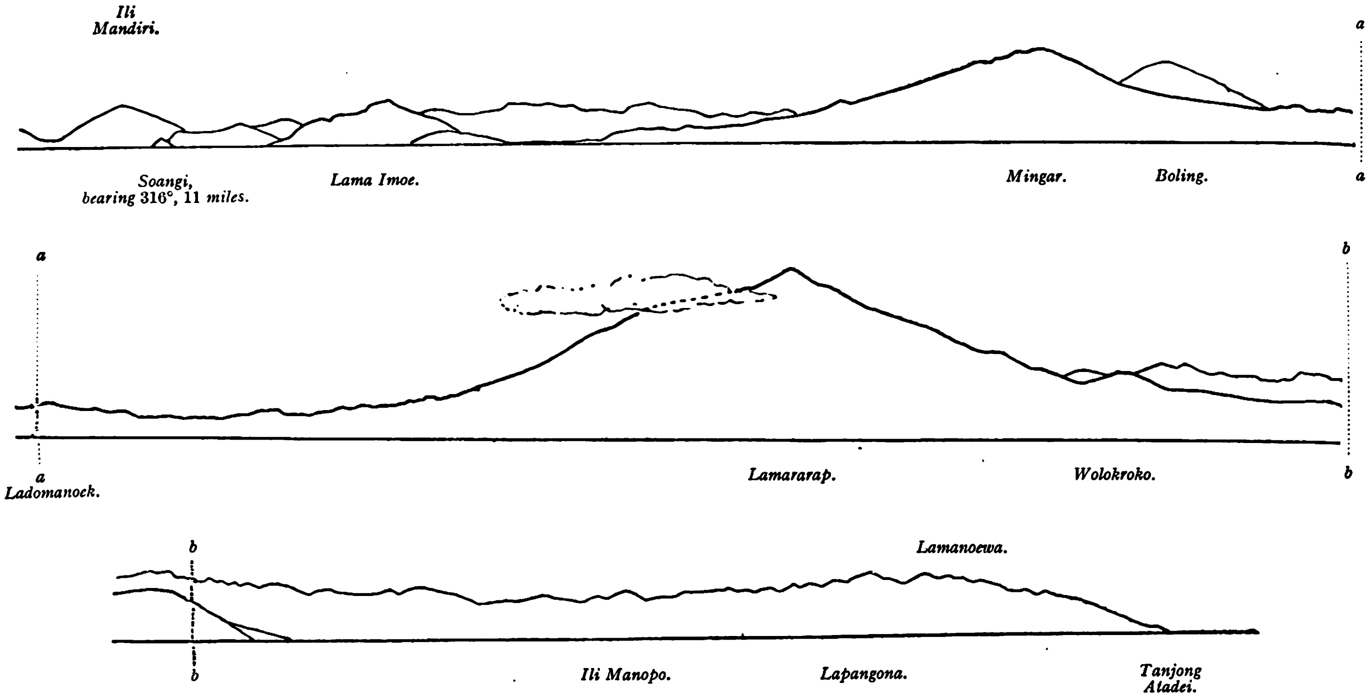
To face page 312.



Straat Lamakera, southern entrance.

(*Original dated* 1933.)

To face page 313.



View, in three parts, of the south coast of Lomblen.
(*Original dated* 1933.)

Chart 2776.

about three-quarters of a mile eastward of the point. Some rocks above water extend about 1½ cables offshore, a short distance south-westward of Tanjong Watoe (Watu) Woko.

The eastern end of Solor and the south-eastern side of that island have been described on page 310.

The west coast of Lomblen between Tanjong Wai Wowang (page 312) and Tanjong Lowoekoema (Lowukuma), a low, steep point 3¾ miles west-south-westward, has some rocky points and the hills again approach the coast. About 1¼ miles southward of Tanjong Lowoekoema is a summit, 1,171 feet ($356^{m}9$) high, which from northward appears as a sharp peak, and from westward as a wide ridge with two clumps of trees on it. Mitan wutun, about 2½ miles south-westward of Tanjong Lowoekoema, is a rocky point formed by a steep ridge covered with reeds. Tanjong Liang Meah, nearly 7½ miles south-westward of Mitan wutun, is rocky; a flat, bare, isolated hill, 328 feet ($100^{m}0$) high, with a single palm on it, lies near the coast about 2 miles north-eastward of this point, and close southward of the hill is Pasar Soeba (Suba). The south-western extremity of Lomblen consists of a steep, rocky mountain rising to the two peaks of Lama Imoe (Imu), 1,919 feet ($584^{m}9$) high, and is separated from Mingar, 3,346 feet ($1,019^{m}8$) high, 4¼ miles east-north-eastward, by a low plain; Tanjong Soeba (Suba) is the southern extremity of the Lama Imoe promontory.

An extensive bank, with a least depth of 4¾ fathoms ($8^{m}7$) over it, and only slightly marked by discoloration, lies nearly in the middle of Straat Lamakera and about 3 miles eastward of Tanjong Mottong (*Lat. 8° 26′ S., Long. 123° 10′ E.*); this bank consists of sand and stones, and is tolerably steep-to on the north-western and south-eastern sides. About 3 miles eastward of this bank, and 1½ miles from the Lomblen shore, is another bank of coral and stones, with a least depth of 7 fathoms ($12^{m}8$) over it; a small reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies about 1½ miles southward of this latter bank and 7 cables off the Lomblen shore.

Caution.—When making for Straat Lamakera from southward, Lamararap (page 316), Mingar, and Lama Imoe, in the south-western part of Lomblen, as well as Boling (page 304), Ili Mandiri (page 300) and the two Lobetobi peaks (page 283), are visible from a great distance; care should be taken, however, that Lama Imoe gebergte is not mistaken for an island, as the low part between this range and Mingar gives it that appearance from a distance. Boling, although farther off when approaching the strait from southward, can be seen almost as plainly as the mountains in the southern part of Lomblen, and a mistake may thus arise in the reckoning; Lamararap is the sharpest, Mingar rounder and lower, Boling conical and very regular, and Lama Imoe is rugged, with two peaks. *See* view facing page 312.

Tidal streams.—The tidal streams in Straat Boling and Straat Lamakera set north-eastward and south-westward. In the former the north-east-going stream sets towards Tanjong Woer Gobin and the reef on which Ipet and Kenawah islets lie, whilst the south-west-going stream sets more in the direction of the channel. The horizontal movement of the water in Straat Boling and Straat Lamakera is of a semi-diurnal character. The north-east-going stream commences from 2 to 3 hours before to 2 to 3 hours after the moon's passage, and usually

Charts 1697, 942a, 2759a.

earlier in Straat Lamakera. The south-west-going stream commences from 3 to 4 hours after to 9 to 10 hours after the moon's passage.

The strongest tidal streams are found in the narrows close under the south-eastern point of Adoenara; during the survey a rate of 5 knots was observed two days after spring tides, so it may be assumed that the maximum rate there may be about 7 knots. The tidal streams are also very strong in Straat Boling. Spring tides occur about 3 days after full moon and new moon, and neap tides the same period after the quarters.

Eddies are caused by the strong tidal streams in the various bights and bays in the straits; the north-east-going stream into Baai van Leba Leba causes a strong eddy in the bight on the Adoenara shore opposite, northward of Deri wutun. The surveying vessel, when lying at anchor here, was nearly always swung with her head northward. Southward of Tanjong Toeak, on the eastern side of Straat Boling the stream sets westward with the north-east-going stream in the strait, thus causing the set towards Tanjong Woer Gobin, mentioned above. Farther inside Baai van Leba Leba the tidal streams are not so noticeable.

In Straat Lamakera the north-east-going stream sets strongly towards the Adoenara shore, especially between Tanjong Watoe Woko and Ana-boeraka, but decreases in strength towards the latter point. With the south-west-going stream there is a strong eddy under this part of the coast, and heavy tide-rips may be seen both here and northward of Tanjong Watoe Woko. With strong tidal streams there are often whirling eddies near the Lomblen shore, off Mitan wutun, caused by the irregular nature of the bottom. The north-going stream may be expected from 2 to 3 hours before to 2 to 3 hours after the moon's passage, and the south-going stream from 3 to 4 hours after to 9 to 10 hours after the moon's passage.

SOUTHERN SIDE OF LOMBLEN.—Coast.—Soangi, an islet (*Lat. 8° 34′ S., Long. 123′ 14′ E.*), about one mile southward of Tanjong Soeba (page 313), the south-western extremity of Lomblen, is rocky and almost bare; a point on its north-eastern side forms an arch, opening in a north-westerly and south-easterly direction. A rock awash lies on the 10-fathom ($18^{m}3$) line about three-quarters of a cable off the north-western point of the islet. There is a clear passage between Soangi and the Lomblen coast, but the tidal streams are strong during spring tides. *See* views facing page 313.

Telok Atoe (Atu), a small bay eastward of Tanjong Soeba, has regular depths of from 6 to 9 fathoms ($11^{m}0$ to $16^{m}5$), so that anchorage, fairly well sheltered in the west monsoon, may be obtained here; there is a sandy beach along the greater part of the shore of the bay, and a prominent group of black rocks lies close offshore on the eastern side.

Telok Atawai is entered between Tanjong Konga, about 4½ miles eastward of Tanjong Soeba, and Tanjong Beloppo, 3½ miles farther east-south-eastward. The western shore rises gradually, and at the head of the bay a plain extends far inland; the eastern shore is steep-to and rises to Lamararap, 5,394 feet ($1,644^{m}1$) high, about 2 miles north-eastward of Tanjong Beloppo. On the western and northern shores there is a sandy beach and a narrow coastal reef, and vessels

Chart 2776.

can anchor, in depths of from 20 to 30 fathoms (36^{m}6 to 54^{m}9), about 1½ cables offshore.

Noebi (Nubi), a prominent sharp rock, 102 feet (31^{m}1) high, with a few trees on the top, lies close off the coast about 1¾ miles south-eastward of Tonjong Beloppo. Wolo wutun, 3 miles south-eastward of Tanjong Beloppo, is formed by a long, sharp ridge from Lamararap, which ends in a narrow plateau rising steeply from the sea to an elevation of 121 feet (36^{m}9); there is a small village on the plateau, and the inhabitants have constructed a bamboo ladder down the almost vertical cliff on the eastern side. The slopes of Lamararap are well populated and cultivated, and there are some large villages. There is a small bay on each side of Wolo wutun; the western bay has a small sandy beach in the north-western corner, and Tanjong Bolèr, the western entrance point of the bay, is a long, low, rocky point having the appearance of a pier.

Lamararap village, 1½ miles east-north-eastward of Wolo wutun, consists of two parts; the lower part is situated on a sandy beach and is named Lewo Lérè, and the upper part, named Lewo Belolong, where the chief of the district resides, is built on a rock by the sea. In the lower village there is a row of sheds along the beach for housing the fishing praus; Lolo wutun lies about half a mile eastward of the village.

Baai van Labala.—Baai van Labala, eastward of Lolo wutun, is backed by high mountainous land, which descends fairly steeply to the shores of the bay, except in the north-western part, where there is a small plain terminating a short distance inland in a wide basin, probably the remains of an old volcano, a ridge of mountains about 2½ miles inland being the northern part of the crater wall. Lewo wutun, near the western side of the head of the bay, is a low ridge from the mountains ending in bare rocks. On the eastern side of the bay is a peculiar peninsula, the western extremity of which is named Loesi (Lusi) Tobi wutun, on which a sharp cone, 108 feet (32^{m}9) high, forms a good landmark when seen from westward. The whole of the eastern shore is formed by rocky ridges from the mountains inland, and rises very steeply by Tanjong Atadei (*Lat. 8° 35′ S., Long. 123° 33′ E.*), situated 7½ miles eastward of Lolo wutun.

On the western side of the bay, 1¾ miles north-eastward of Lolo wutun, there is a projecting part of the coastal reef, with some large rocks on it; the outermost of these, named Watoe Boeah (Watu Buah), lies 1½ cables offshore. A rock awash lies in the north-eastern part of the bay, about 8 cables northward of Loesi Tobi wutun and 1½ cables offshore, and a similar rock lies in the approach to the small inlet on the southern side of the peninsula.

Owing to the great depths, anchorage can only be obtained in the two inlets at the head of the bay, on either side of Lewo wutun. Labala village, where the Rajah of the district resides, is situated on the beach in the eastern of these inlets, and is divided into several parts, each surrounded by a strong palisade, with narrow passages between; Moelang (Mulang) village is situated on a small plateau close westward of Labala. A small stream flows out eastward of Labala, and the mud carried down by it in the rainy season causes discoloration of the water some distance offshore.

There is anchorage off the sandy beach eastward of Labala, with

Charts 1697, 942a, 2759a.

Chart 2776.

the flagstaff bearing 310°, and Lewo wutun, 248°, in a depth of 24 fathoms (43^m9), mud and sand, 1½ cables offshore and one cable outside the 3-fathom (5^m5) line. There is also anchorage in the western inlet, in a depth of 25 fathoms (45^m7), coarse sand and stones, 1½ cables offshore, with Wolokroko, about 1½ miles west-north-westward of Lolo wutun, bearing 238°, and a summit, 3,704 feet ($1{,}129^m0$) high, about 3¼ miles northward of Lewo wutun, 353°. During November and December, with the prevailing south-westerly winds, the latter anchorage is the better of the two, and landing is easier in the western inlet.

Mountains.—Baai van Labala is backed by some of the highest mountains in Lomblen, most of them showing traces of having been former craters. Lamararap, on the western side of the bay, is the most prominent; when seen from a north-westerly or south-easterly direction it shows a very sharp summit, and has a deep cleft on the south-western side; on its south-eastern slope are two cones, Wolokroko, with a somewhat rounded summit, 2,037 feet (620^m9) high, and the other one, 1,388 feet (433^m1) high, nearer the coast, east-south-eastward.

The other mountains around the bay are separated from Lamararap by a deep saddle; the south-western of these is Bogé, with a fairly sharp summit, 3,291 feet ($1{,}003^m1$) high, about 2½ miles north-eastward of Lamararap; about 1¼ and 2¾ miles north-eastward of Bogé are two bare summits, 3,130 and 3,704 feet (954^m0 and $1{,}129^m0$) high, respectively, Rodan 3,268 feet (996^m1) high, 2½ miles northward of Lewo wutun, has a long summit.

Ili Manopo, 4¾ miles eastward of Rodan, has a regular dome-shaped summit. On the eastern side of the bay are two prominent mountains, Lapangona, the northern, 3,169 feet (965^m9) high, is tolerably sharp, and Lamanoewa (Lamanuwa) is 2,874 feet (876^m0) high, and sharper.

NORTHERN SIDE OF LOMBLEN.—Coast.—The north-western extremity of Lomblen consists of a peninsula rising in the eastern part to Lewotolo (page 317), whilst the western part forms another, relatively low, peninsula, which has been described with Straat Boling on page 311. Between Tanjong Wai Au and Moenoe (Munu) wutun (*Lat. 8° 16′ S., Long. 123° 26′ E.*), 1¾ miles south-eastward, the coast forms a bay, entirely obstructed by reefs and with mangrove shores; Moenoe wutun is a prominent rocky point with white vertical cliffs in places, and is the extremity of a hilly ridge. Eastward of this point the mangroves disappear, and there is a sandy beach for 2 miles eastward to Lewobéla village, one of the many well-populated settlements on the slopes of Lewotolo. A small ridge, with moderate depths over it, extends from a rocky point immediately northward of Lewobéla village, and vessels can anchor 2 cables offshore, in depths of from 23 to 30 fathoms (42^m1 to 54^m9), coral, with the southern side of Watoe Peni in line with Tanjong Wai Au, bearing about 282°; the bottom is fairly steep and the ridge narrow, so that vessels must be exactly on this mark to obtain these depths.

Between Lewobéla village and Tanjong Watoe Manoek (Watu Manuk), 3½ miles north-eastward, the coast becomes steep and rocky;

Charts 1697, 942a, 2759a.

from the latter point to Horégala wutun, about 2½ miles eastward, there is a flat, low strip of land bordered by a broad sandy beach. There are numerous villages along this part, particularly on the slopes; the principal on the coast are Atawatoe (Atawatu), Lamanipo, and Boli Moetien (Mutien). The depths increase rapidly outside the coastal reef, so there is no anchorage.

Lewotolo, about 4 miles west-south-westward of Horégala wutun, is an active volcano with smoke and sulphur continually rising from it, but the natives have no knowledge of any eruption having taken place; it has a broad summit, the highest part being on the south-eastern side, which is covered with ashes and shows some yellow-green stripes. A ridge runs down in a north-easterly direction to Horégala wutun, where it terminates in a flat hill, 266 feet (81^{m}1) high; another ridge runs 3¼ miles southward to Ili Lolong, 433 feet (132^{m}0) high, on the western shore of Telok Wai Hinga.

Telok Lewaling.—Telok Wai Hinga.—The bay, entered between Horégala wutun and Batjatan (Bachatan) wutun, 3 miles north-eastward, is divided into two parts by the Neira peninsula; the northern part is named Telok Lewaling, and the southern part Telok Wai Hinga. Except in the south-western part of the latter, where the coastal reef is more pronounced and where some detached dangers lie under the coast, the entire bay is clear of dangers and affords good shelter in both monsoons. About 6 cables eastward of Lamariang wutun, on the western side of the bay, 3¾ miles south-south-westward of Horégala wutun, there is a reef, with a depth of 5 fathoms (9^{m}1) over it.

Neira peninsula is covered with reeds and eucalyptus trees, and attains an elevation of 886 feet (270^{m}0) in the south-western part; Poeka (Puka) wutun, the north-western point of this peninsula, may be identified by a hillock on it, 177 feet (53^{m}9) high, and is a good mark for entering the bay. Lewaling (*Lat. 8° 17′ S., Long. 123° 38′ E.*), in the south-eastern corner of Telok Lewaling, is the principal village. Wai Hinga village stands about 2 cables within the southern shore of Telok Wai Hinga, and is partly hidden by trees; the two large villages Lewawerang and Oedé (Udé) are situated about one mile inland, on the southern side of Telok Wai Hinga, at elevations of 1,634 and 1,063 feet (498^{m}0 and 324^{m}0), respectively. On the western shore are the smaller villages Lewolo, Lamariang and Waipoekang (Waipukang). Only a few provisions, such as eggs, fowls, pigs, and goats, are obtainable on the north coast of Lomblen.

There is fairly good anchorage, in the South-east monsoon, off Lewaling village, in a depth of about 20 fathoms (36^{m}6), 2 cables offshore, with the village bearing 090°. There is also good anchorage in the inlet on the eastern side of the isthmus of Neira peninsula, in depths of from 20 to 28 fathoms (36^{m}6 to 51^{m}2), sand, with a prominent rocky point forming the south-eastern extremity of the peninsula, bearing about 270°, and a projecting sandy spit on the eastern side about in line with Batjatan wutun, bearing about 359°.

Very good anchorage can be obtained in the southern part of Telok Wai Hinga, off Pasar Hadakéwa, which consists of a few huts on the beach, in depths of from 20 to 25 fathoms (36^{m}6 to 45^{m}7), about 4 cables offshore. When anchoring in the south-western part of this bay great attention should be paid to the dangers there, as they are

Chart 2776.

not always marked by discoloration. Abreast Ili Lolong a long, drying tongue extends in a south-south-easterly direction, prolonged southward by a small reef; there is good, but confined anchorage westward of this tongue, and larger vessels can anchor farther southward, in Labuan Damaroa Ona. In the west monsoon there is sheltered, but confined anchorage in the inlet southward of Horégala wutun.

Coast.—The hilly land of the uninhabited peninsula separating Telok Lewaling from Telok Baloerin (Balurin), the next bay eastward, is readily identified from both eastward and westward; entirely covered with reeds, with occasional small groups of trees, it is a very prominent part of the coast. Its greatest elevation is on the western side, where it rises almost vertically from Telok Lewaling to an elevation of 561 feet (171^{m}0), about 2¼ miles south-eastward of Batjatan.

Batjatan wutun is low, flat, and rocky, with a few stunted trees on it. Menapa wutun, the western entrance point of Telok Baloerin and about 3¼ miles eastward of Batjatan wutun, is fairly high and rocky. Both points rise steeply from the sea, but the coastal reef extends some distance from the northern side of the peninsula, especially from Batjatan wutun.

Charts 2776, 1697.

Telok Baloerin.—Telok Baloerin, entered between Menapa wutun (*Lat. 8° 14′ S., Long. 123° 40′ E.*), and Oeho wutun, 2½ miles eastward, is of little importance, as there are no settlements of any importance on its shores, and the depths in the greater part of the bay prohibit anchorage; Labuan Wai Lolong, in the south-western part of the bay, is the only comparatively serviceable anchorage. Liangbono wutun, at the head of the bay, is a steep, rocky point; the shore between this point and Oeho wutun, a prominent rocky point, 187 feet (57^{m}0) high, covered with reeds and palms, is fringed by an extensive reef, particularly in the southern part. Baloerin (Balurin) village stands at the head of a small inlet on the eastern side of the bay, entered through a gap in the coastal reef, which affords good shelter for praus.

The anchorage in Labuan Wai Lolong is reached by steering for the mouth of a small stream, which flows out about half a mile southwestward of Liangbono wutun, bearing 197°, and anchoring in depths of from 20 to 30 fathoms (36^{m}6 to 54^{m}9), mud. This anchorage, which is barely 3 cables wide, is bounded westward by a reef, which dries, on which is a sandbank always above water; by anchoring on the above bearing, and with the sandbank in line with Lewotolo (page 317), bearing about 262°, a vessel will be in a depth of 24 fathoms (43^{m}9).

Small vessels can anchor westward of the above sandbank, in a depth of 15 fathoms (27^{m}4), mud, about 2 cables east-north-eastward of Paraka wutun and just outside the line joining this point and the sandbank; to reach this anchorage vessels should pass between the reefs by eye and by sounding.

Chart 1697.

Coast.—The coast between Oeho wutun and Pau wutun, 5 miles north-eastward, is mostly formed by ridges from Kédang, a mountain 5,030 feet (1,533^{m}1) high, situated 2½ miles southward of Pau wutun; it is the highest mountain in Lomblen except Lamararap, on the southern side of the island. Ili Ata Léwar, 5 miles south-south-westward of Kédang, is a prominent mountain, 2,438 feet (743^{m}1) high.

Charts 942a, 2759a.

Chart 1697.

Moderately strong tidal streams set round Pau wutun, elsewhere along the north coast of Lomblen the tidal streams are weak. Dololong village is situated on a steep, rocky point, 1¾ miles eastward of Oeho wutun. Kalikoe (Kalikur), about half a mile south-westward of Pau wutun, is a fairly large village and is the principal place of export on the north coast of Lomblen ; it can be readily identified by the mosque and a white tomb on a large rock by the sea. A small pier extends offshore, forming a small harbour for praus, but the best landing place is on the beach westward of the tomb. There are great depths immediately outside the coastal reef, and temporary anchorage only can be obtained, by vessels with local knowledge, in the bight westward of Kalikoe, in depths of from 40 to 50 fathoms (73^{m}2 to 91^{m}4), about three-quarters of a cable from the coastal reef.

Between Pau wutun and Modang wutun, 2¼ miles east-south-eastward, the coast becomes less steep, although occasional rocky spurs run down from the mountains to the sea ; Oemah Wola village is situated on a spur of Kédang, about half a mile inland and southward of Modang wutun. Tanjong Wa LÂdjar (Lajar), about 2¾ miles south-eastward of Modang wutun, is a high rocky point, and Tanjong Ka Watar, nearly one mile farther south-eastward, is low. Telok Hading Manoe (Manu), close eastward of the latter, is of no importance to shipping, as it is almost entirely occupied by a wide coastal reef, although praus can pass close along the shore through a channel in the reef. The shores of the bay and the coast as far as Tanjong Toewah (Tuwah) Lewang, about 3 miles eastward of Tanjong Ka Watar (*Lat. 8° 13′ S., Long. 123° 51′ E.*), are covered with mangroves ; between Tanjong Toewah Lewang and Tanjong Leoer (Leur), the eastern extremity of Lomblen, and situated 2¼ miles south-eastward, there is an almost uninterrupted sandy beach. The whole coast between Modang wutun and Tanjong Leoer is fringed by a fairly wide reef, outside which the depths increase very rapidly.

Outlying island.—Dangers.—Eiland Komba or Batu Tara, about 25 miles northward of Batjatan wutun (page 317), is 2,451 feet (747^{m}0) high, and is an excellent guide for vessels making Straaten Flores, Boling, or Alor from northward. It consists of an active volcano, the crater of which has crumbled on the eastern side, showing a deep ravine down to the coast when viewed from this direction ; smoke issues from it occasionally. The island is rocky and sparsely covered with vegetation. There are small beaches of black volcanic sand in places along the coast ; the coastal reef is narrow, and the depths increase so rapidly outside that anchorage is almost impracticable.

A rock, with a depth of 5 feet (1^{m}5) over it, lies in the bight on the western side of the island, about 2 cables offshore, and a 4¾-fathom (8^{m}7) patch lies about 1¾ cables off the north-western side of the island.

STRAAT ALOR.—Straat Alor, separating Lomblen from Pantar, appears to be entirely clear of dangers, but it is only used for local navigation amongst these islands. From northward, the northern entrance to the strait, between Tanjong Leoer and Noeha (Nuha) wutun, about 9 miles east-south-eastward, will be readily identified by the high, light green island Batang, lying about 3½ miles north-north-eastward of Noeha wutun. Kedang (page 318) is also a good

Charts 942a, 2759a.

Chart 1697.

mark. Vessels generally pass eastward of Batang, or westward of Lapan, an island nearly 2 miles westward.

From southward, the high island Roesa (Rusa), lying nearly in the middle of the southern entrance, will be easily identified. The safest passage lies westward of this island, although vessels from south-eastward can pass through Selat Ambeang, which lies between the south-western extremity of Pantar and Kambing; the tidal streams in this passage are, however, strong and irregular.

Steam vessels of low power should not attempt to pass through Straat Alor from northward during the South-east monsoon, as, with the predominating southerly winds, it is impracticable to get through on one tide.

The north-western side of Straat Alor, between Tanjong Leoer and Tanjong Bao Belewang, a low point about 4 miles south-westward, is low, a few hills lying some distance inland; a rock, covered with vegetation, lies close off the latter point. Tanjong Batoe (Batu) Merah, about 1¾ miles west-south-westward of Tanjong Bao Belewang (*Lat. 8° 22′ S., Long. 123° 57′ E.*), consists of three rocky points of a reddish colour rising steeply from the sea; a detached rock, named Bidjo Belewang, lies close off the eastern of these points, and another rock lies close off the western.

On the south-eastern side of the strait southward of Noeha wutun there are several prominent summits. Batang Lol, 3¼ miles southward of the point, attains an elevation of 3,068 feet ($935^{m}1$); Lata Pain, about 1½ miles south-eastward of the point, is 1,690 feet ($515^{m}1$) high, and is the most noticeable summit in this vicinity. The coast between Noeha wutun and Tanjong Sojang, the high rocky south-western extremity of Pantar, about 12½ miles south-westward, is mostly low and covered with mangroves, except for Tanjong Oleh Matang, a rocky point on the eastern side of the passage between Pantar and Marisa; Kajian (Kayian), the only village in the south-western part of Pantar, is situated at the northern entrance of this passage.

Wili, a plateau, 1,454 feet ($443^{m}2$) high, on the south-western extremity of Pantar, is very prominent from northward or southward, and when seen from the Savu sea appears as an island. Toentoeli (Tuntuli), on the eastern side of Pantar, 8 miles southward of Tanjong Watoe Poehon, the northern extremity of the island, has a sharp summit when seen from north-westward, 3,278 feet ($999^{m}2$) high.

Lapan, lying in the middle of the northern entrance of Straat Alor, is a low island with a very prominent high tree on its western side; a reef, which dries, with a sandbank always above water on its north-western extremity, extends 2½ miles north-north-eastward from the island. The eastern and western extremities of Batang are low, so that from a distance it appears like a needle; a narrow reef extends from the north-eastern extremity, but elsewhere the island is steep-to.

Marisa, an island close off the western side of Pantar, about 7 miles south-westward of Noeha wutun, has a flat summit, 630 feet ($192^{m}0$) high, and is inhabited by people from Pantar; there are numerous deer on the island. Tanjong Koemeroe, the western extremity, may be identified by a white sandy beach and some isolated trees. A rock, named Watoe Manoe (Watu Manu), lies close off Tanjong Kasékang, the south-western extremity of the island. The channel between

Charts 942a, 2759a.

Chart 1697.

Marisa and Pantar is clear of dangers and deep, but, owing to the strong tidal streams, is only fit for praus.

Roesa is 1,116 feet ($340^{m}2$) high, but is fairly low at its southern end, except for two steep points, named Tanjong Lapa, the south-eastern extremity, which is 325 feet ($99^{m}1$) high, appearing as an islet from a distance, and Tanjong Toewah, the southern extremity. The coast is mostly steep and rocky. A plateau, with gradually increasing depths, extends from the western and southern sides, but the depths increase rapidly off the north and east coasts. Watoe Baloe (Watu Balu), a prominent rocky islet, 89 feet ($27^{m}1$) high, and covered with vegetation, lies about half a mile off the west coast. Roesa is entirely covered with reeds and is uninhabited, but there are numerous deer.

Kambing, about 2½ miles south-eastward of Roesa and about 1¼ miles westward of Tanjong Sojang, has a hillock, 321 feet ($97^{m}8$) high, in the north-eastern part; elsewhere it is fairly low, with a rocky coast occasionally interrupted by sandy beaches. Some black rocks above water lie close off the south coast, and a rock, named Batu Bawa (*Lat. 8° 27′ S., Long. 123° 53′ E.*), lies about 3 cables southward.

Watoe (Watu) Ile, a rocky islet, lies close off a prominent point, 256 feet ($78^{m}0$) high, about 2½ miles south-eastward of Tanjong Sojang; the coast between these two points is fringed by rocks.

The coast on the north-western side of Straat Alor, in the vicinity of Ata Nila village, situated 5½ miles west-south-westward of Tanjong Batoe Merah (page 320), is low and fringed by a narrow reef. Batu Manoe, 3½ miles south-south-westward of Ata Nila, is a large black rock on a sandy beach.

At Tanjong Nanga Lébang, 2¾ miles south-south-westward of Batu Manoe, the coast becomes generally rocky, with occasional steep points. Tanjong Nanga Lebang and Hoelo wutun, nearly one mile south-south-westward, are steep points with hills on them, 397 and 489 feet ($121^{m}0$ and $149^{m}0$) high, respectively. Komi wutun, about 1½ miles south-south-westward of Hoelo wutun, and Tanjong Béloe (Bela) Galeh, 1½ miles westward of Komi wutun, are steep points formed by spurs from the mountains inland; there is a very prominent tree on Komi wutun.

Chart 2776.

Between Paoe (Pau) Gora wutun, about 7½ miles south-westward of Komi wutun, and Tanjong Atadei, 4½ miles south-south-westward, numerous spurs from the mountains form high, rocky points, and some detached rocks lie close off the coast in places. Close south-westward of Tanjong Penoetoen (Penutun), 2¾ miles southward of Paoe Gora wutun, the coast is somewhat less steep and there is a small sandy beach.

The south-eastern part of Lomblen consists of high mountain land. Lama Héroe (Héru), near the coast between Paoe Gora wutun and Tanjong Penoetoen, is the most prominent of these mountains, and shows four sharp peaks when seen from north-eastward; the eastern side of this mountain is almost vertical. Ili Manopo, about 2½ miles north-westward of Lama Héroe, has a prominent conical summit when seen from eastward.

Chart 1697.

Anchorages.—Telok Waë Poehe (Puhe), on the north-western side of Straat Alor, is entered between Tanjong Batoe Merah and Tanjong

Charts 942a, 2759a.

Chart 1697.

Belkodi, about 3 miles westward; it affords good anchorage for vessels with local knowledge, in a depth of about 35 fathoms (64^m0), sand. The bottom here is not so steep, and vessels lie to a great extent out of the strong tidal streams running along this coast; the maximum rate observed at the anchorage was 2 knots, generally setting in a north-easterly direction, as there is usually an eddy here when there is a south-going stream in the strait. The shore of the bay consists of a sandy beach fringed by a reef, and the land rises gradually to the hills inland. There are a few huts close north-eastward of Tanjong Belkodi (*Lat. 8° 17′ S., Long. 123° 47′ E.*), and there is a prominent round-topped tree about half a mile northward of this point.

Very good anchorage can be obtained by vessels with local knowledge off Ata Nila village, the only one on the east coast of Lomblen, although huts will be found in places, used more as temporary abodes.

Chart 2776.

Rai Waë Teba One, entered between Tanjong Béloe Galeh and Paoe Gora wutun, is backed by steep mountains, but there are no prominent summits; the depths in the bay are considerable, and the bottom slopes steeply near the shore.

Good anchorage can be obtained by vessels with local knowledge in the northern part of the bay, named Rai Boboen (Bobun) One, about 2 cables southward of Tepi wutun, a prominent, white, rocky point at the head of the bay and about 1¾ miles north-north-westward of Tanjong Béloe Galeh, in a depth of about 28 fathoms (51^m2), sand; there is a temporary fishing settlement close westward of Tepi wutun. Three small rivers flow into Rai Boboen One, of which the Waë Kima is the principal. There is also anchorage for vessels with local knowledge in the south-western part of Rai Waë Teba One, southward of the mouth of the Waë Teba, situated about 5½ miles south-westward of Tanjong Béloe Galeh, in a depth of about 30 fathoms (54^m9), sand.

Chart 1697.

Good anchorage may be obtained by vessels with local knowledge, in a depth of 11 fathoms (20^m1), with just sufficient room to swing, in Telok Woloe, an inlet in the coastal reef on the south-eastern side of Straat Alor, about 3 miles north-north-eastward of Tanjong Sojang. Entering this inlet at low water presents no difficulty, as the coastal reef is then dry; at high water vessels should steer for the mouth of Kali Okalassa, at the head of the inlet, where there is a small, prominent wood, bearing 080°.

There is a fairly good anchorage for vessels with local knowledge, in a depth of 30 fathoms (54^m9), sand, off the western side of Roesa, with Watoe Baloe bearing 180°, and Tanjong Kebingi, in about the middle of the western side, bearing 090°; there is little tidal stream here.

Tidal streams.—The horizontal movement of the water in Straat Alor is of a semi-diurnal character, and may attain a considerable rate. Owing to the lack of anchorage in the strait it was impossible to carry out any thorough observations during the survey. The following general information, obtained from the natives and checked by observations, gives a fairly good idea of the prevailing tidal streams.

The tidal streams mainly follow the direction of the strait, throughout. During the east monsoon the south-west-going stream lasts longer and is stronger than the north-east-going stream. It has been observed that the south-west-going stream flowed from about 2 hours after to about 9 hours after the moon's passage, and the north-east-going stream for the remaining hours. During the west monsoon the north-east-going stream is presumably of longer duration and stronger than the south-west-going stream.

Spring tide of the horizontal movement of the water appears to fall 2 to 3 days after full moon and new moon; neaps are thus from 2 to 3 days after the quarters. The rate at spring tides averages from 5 to 6 knots. The maximum rate can probably be expected when spring tides occur during a period of the moon's greatest declination either north or south, and particularly during the years that the moon's declination is greater than the sun's declination.

In the northern part of the strait the rate of the tidal stream is considerably less than in the southern part, except close off Tanjong Leoer (*Lat. 8° 15′ S., Long. 123° 55′ E.*), where a rate of 5 knots was observed. A rate of 8 knots was observed in the narrow channel between Marisa and Pantar. Off projecting points and around the islands the directions and rate of the tidal streams are naturally irregular.

NORTH-WESTERN SIDE OF PANTAR.—Anchorages.—The coast between Tanjong Moena (Muna), the north-eastern extremity of Pantar, and Kabir village, about 7½ miles south-westward, is almost entirely covered by mangroves, occasionally interrupted by a sandy beach; the coast is fringed by a steep-to reef, which dries, and there is no anchorage. Tanjong Lawar, about 5½ miles south-westward of Tanjong Moena, may be identified by a tree standing in the water off the point.

Reede Kabir.—Kabir village, the residence of the native district chief, is situated on a narrow plain and is the most important village in Pantar. The coastal reef extends about 2 cables offshore northward of the village, but is very narrow off the village and extends over 2 cables again farther southward, whilst a narrow reef, with a depth of 6 feet (1^{m}8) over its northern extremity, extends about 8 cables northward from a position on the coast about 8 cables south-westward of the village; within this reef is a deep basin, the only danger being a 2¾-fathom (5^{m}0) patch lying about 3 cables westward of the village. The basin is entered from northward, by a passage about 2 cables wide between the northern extremity of the narrow reef and the coastal reef eastward; there is also a deep passage about one cable wide through the reef about 2½ cables from its northern end; the outer edge of the coastal reef is marked by an unofficial buoy; this anchorage is only available for vessels with local knowledge.

A vessel should approach the roadstead by steering for the buoy, bearing about 158°, thence passing westward of it and then steer about 180° into the roadstead. The village is easily identified from seaward by some houses on the beach. There is good anchorage, in a depth of about 25 fathoms (45^{m}7), with the buoy bearing 000°, and a bridge over the river close southward of Kabir flagstaff bearing 135°. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and is known by them as Reede Baloerin.

Blang Merang baai.—Blang Merang baai is entered between Noeha wutun and Tanjong Moang, a rocky point, 6½ miles eastward. From a position about 4 miles inside the entrance an inner bay extends

Chart 1697.

about 1½ miles south-south-eastward; the shores of the outer bay are mostly rocky, but those of the inner bay are marshy.

The entrance to the inner bay, between the coastal reef on either side, is about 1¼ cables wide, and is deep in the fairway. Blang Merang village, where the native chief of the southern part of Pantar resides, is situated on the western entrance point. When the reefs are plainly visible a vessel with local knowledge will have no difficulty in entering the inner bay; the high, eastern side of Koera (*Lat. 8° 22′ S., Long. 124° 06′ E.*), an island in the inner bay, in line with the summit of Dlaki Dlama, a mountain on the southern extremity of Pantar (*see* below), bearing 178°, leads clear between the coastal reefs on either side; the summit of Dlaki Dlama is, however, generally obscured by clouds. The edges of the coastal reefs are sometimes marked by beacons placed by the natives, but these cannot be relied on. When past the narrows there is good anchorage, in a depth of about 22 fathoms (40^{m}2), mud and sand, or vessels can anchor in a less depth farther inside the bay. There is no tidal stream.

ALOR EILANDEN.—Alor eilanden consist of the two mountainous islands of Pantar and Alor, with some smaller islands lying between them. Pantar is divided politically into the two districts, Pantar matá hari and Bernoesa, each being ruled by a Rajah under the supervision of the Government official at Kalabahi, situated on the west coast of Alor; Alor is divided into several states, each ruled by a native chief under the Government official.

Both islands are populated by two distinct races: those who dwell along the coasts, descendants of people from Soembawa, Saleier, and Java, and the mountain inhabitants, who are indigenous; there is a great variety of dialects spoken, and Malay is little understood. The coastal inhabitants live mostly by trade and fishing, and the inhabitants of the mountains by agriculture, breeding cattle, and hunting.

Caution.—Vessels proceeding eastward or westward should, when southward of the parallel of 8° S., be on their guard against the indraught caused by the action of the currents and tidal streams prevailing in the straits between the islands, especially on cloudy or moonless nights. The R.F.A. *War Krishma* experienced a considerable set southward when passing Straat Pantar in August, 1928.

South coast of Pantar.—Eastward of the Wili plateau, on the south-western extremity of Pantar, is lower, hilly land, which rises again to mountainous land occupying the southern extremity of the island. The highest summit in the latter part is Dlaki Dlama, which has an elevation of 4,475 feet (1,364^{m}0) and is tolerably steep on its south-western side, but on the north-eastern side is continued by a slightly lower, thickly wooded ridge terminating in the volcano Siroeng, 2¾ miles north-eastward of Dlaki Dlama and 2,657 feet (809^{m}8) high. Between Dlaki Dlama and Tanjong Boda, the southern extremity of Pantar, is Koka Bodjali, a very prominent double peak 3,077 feet (937^{m}9) high. A large crater lake lies between Dlaki Dlama and Siroeng, and its steep sides are plainly visible from Blang Merang bàai and from Straat Pantar; eastward of the lake are some hot sulphur springs, from which a suffocating smell spreads for miles around.

The south coast of Pantar, between Watoe Ile and Tanjong Boda,

Charts 942a, 2759a.

Chart 1697.

forms a large bay with great depths over the larger part, except on the eastern side, where a bank extends in a south-westerly direction from Tanjong Debi (*Lat. 8° 27′ S., Long. 124° 02′ E.*), about 6 miles eastward of Watoe Ile; the least depth on this bank, nearly 9 fathoms ($16^{m}5$), rocky ground, lies about one mile west-south-westward of Tanjong Debi. Tanjong Ikan Kotong, about one mile north-eastward of Watoe Ile, has a hill on it, 295 feet ($89^{m}9$) high; from this point to the head of the bay the coast is rocky. The shore at the head of the bay is low as far as Tanjong Abalara, a rocky point about one mile north-north-westward of Tanjong Debi, and Batang Lol, 5 miles northward, is plainly visible; Tanjong Abalara and Tanjong Debi are formed by spurs from two hills, 210 feet ($64^{m}0$) and 236 feet ($71^{m}9$) high, respectively. Southward of Tanjong Debi the coast becomes higher again. Between Tanjong Boda and Tanjong Lohajo, about 5 miles eastward, the coast is steep and rocky.

The west coast of Alor is described below, the south coast on page 329, and the north coast on page 328.

Straat Pantar.—Straat Pantar, between Pantar and Alor, is only used by vessels employed on local navigation; the main shipping routes lie through other straits in Kleine Soenda eilanden. The southern entrance of the strait lies between Tanjong Lohajo and Tanjong Marget, about 17 miles east-north-eastward, and the northern entrance between Tanjong Moena and Tanjong Matari, 10½ miles east-north-eastward.

Approaching from northward, the northern entrance of the strait will be easily identified by the high islands Ternate and Réta, lying in the middle of this entrance. From southward, the high, conical island Treweg, lying in the middle of the southern entrance, is an excellent landmark. There are no dangers outside the 100-fathom ($182^{m}9$) line on either side, and directions are unnecessary. *See* views facing page 326.

The east coast of Pantar, between Tanjong Moena and Tanjong Bota Amin, nearly 25 miles south-south-westward, is steep throughout, with occasional rocky points formed by spurs from the mountains. Tanjong Moena is low, with a sandy beach on its western side and a shingle beach on its southern side. Tanjong Koli Solang, about 3½ miles southward of Tanjong Moena, is low and rocky; Tanjong Ela Lara, about 6½ miles southward of Tanjong Koli Solang, is high and rocky.

In addition to Toentoeli, described on page 320, the following mountains are prominent:—Béang Gasang, 2,848 feet ($868^{m}0$) high, about 4½ miles south-westward of Toentoeli; Belaboer Wang, about 3½ miles southward of Béang Gasang and 2,471 feet ($753^{m}2$) high; Koea Mogas, 1,716 feet ($523^{m}0$) high and conical, lying near the coast about 7 miles north-eastward of Tanjong Bota Amin. Dlaki Dlama and the adjacent mountains, on the southern extremity of Pantar, have been described on page 324.

The west coast of Alor, between Tanjong Matari and Tanjong Koemba (Kumba), the northern entrance point of Kebola baai, 10 miles south-westward, is high as far as Bota village, about 2 miles south-westward of Tanjong Matari, and is thence low and covered with mangroves. Bota village is not visible from seaward, but its position is indicated by a group of coconut trees. Between Bota village and

Charts 942a, 2759a.

Chart 1697.

Kokar village, nearly one mile south-south-westward, is a wooded point, and a very prominent detached group of trees stands on the coastal reef off it. At Pasar Weleen (*Lat. 8° 12′ S., Long. 124° 25′ E.*), about 3¾ miles south-westward of Kokar, there is a break in the mangrove growth, and the huts of the village are visible from seaward. Alor village, about 1½ miles northward of Tanjong Koemba, may be identified by a mosque.

Tanjong Koemba has a hillock on it, 216 feet ($65^{m}8$) high. Koemba (Kumba), an island, 230 feet ($70^{m}1$) high, lies close westward of this point. A rock, which dries, lies nearly 2 cables westward of the island; the summit of Ternate in line with the eastern side of Réta, bearing about 349°, leads westward of this rock. The narrow strait between Koemba and Tanjong Koemba is unsafe owing to rocks, which dry, and strong tidal streams.

Kebola baai, entered between Tanjong Koemba and Tanjong Djalono (Jalono), about one mile southward, is described on page 327.

The islands in Straat Pantar rise steeply from the sea and are steep-to. Ternate is mostly low, except in the southern part, where it rises to an elevation of 341 feet ($103^{m}9$); there are a couple of huts on the south coast.

Réta, about one mile southward of Ternate, is fairly low on the north-eastern side, where there are one or two huts.

Poera (Pura), in the middle part of the strait, has the form of a volcano with two summits, 3,327 feet ($1{,}014^{m}0$) high; there are a few settlements along the coast and on the steep slopes. The inhabitants have a peculiar language of their own, and live by fishing and agriculture.

Treweg has a small sandy beach, with large detached rocks on its southern side, where the island is somewhat less steep; Tanjong Kela Tetek, the southern extremity of the island, is high, and a rock, named Wa Raï, lies close off this point. Pa Abang village is situated on the north-west coast, and there is a narrow coastal reef here.

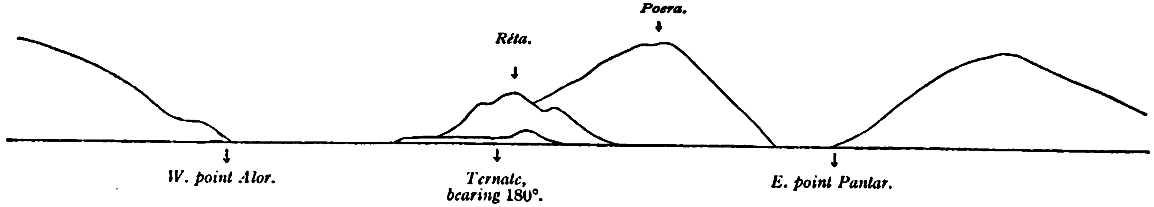
The coast southward of Kebola baai is steep-to, affording no anchorage except in the bay on the western side of Tanjong Marget. The villages Waë Wokan and Lanliki, about 1½ and 2 miles southward of Tanjong Djalono, respectively, are plainly visible from seaward.

A ridge of mountains runs parallel with the west coast of Alor, almost 4 miles inland, the most prominent summits being Tapal, 3,396 feet ($1{,}035^{m}1$) high, Himboer (Himbur), and Adoer Boek (Adur Buk). The south-western extremity of Alor is mostly high and steep (*see* view facing this page). Heleerman village is situated at the mouth of a small river flowing into the head of the bay immediately westward of Tanjong Marget.

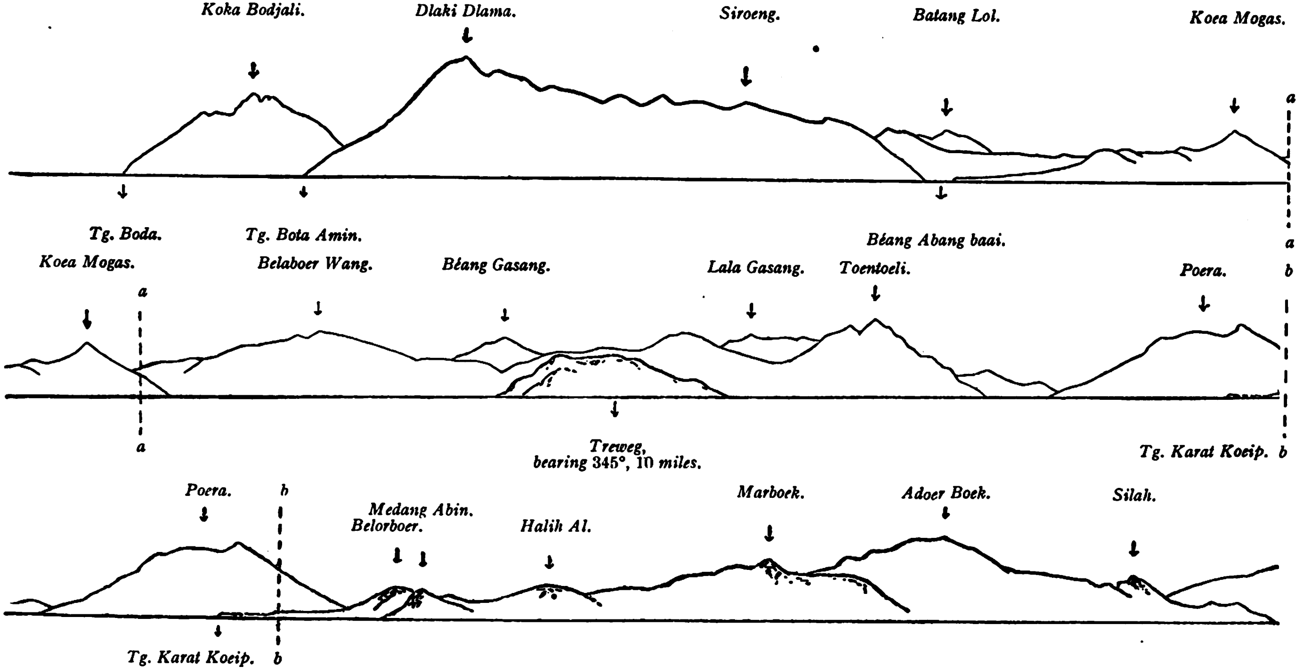
A rock, which dries, lies about 2 cables off Darang Emi, a rounded, rocky point about 3½ miles north-eastward of Tanjong Bota Amin. Tanjong Lohajo is a prominent rocky point with some detached rocks off it. There are several villages along the east coast of Pantar, all connected by a good coastal road.

Anchorages in Straat Pantar.—Light.—The only recommended anchorage on the east coast of Pantar is Béang Abang, a small bay about 4½ miles north-eastward of Tanjong Bota Amin; vessels with local knowledge can obtain good anchorage in the northern part of

To face page 326.

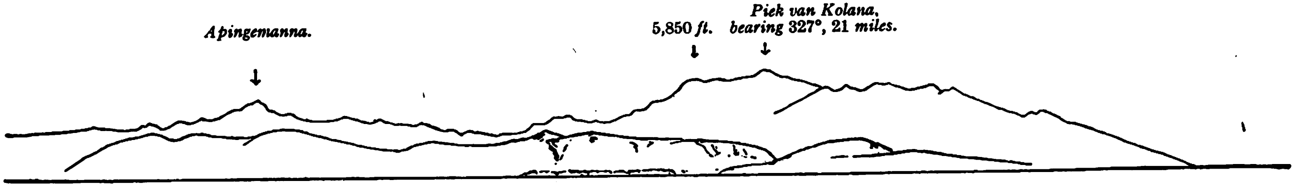


Straat Pantar, northern entrance.
(*Original dated* 1933.)



View, in three parts, of southern entrance of Straat Pantar.
(*Original dated* 1933.)

To face page 327.


Apingemanna.
5,850 ft.
Piek van Kolana,
bearing 327°, 21 miles.

Alor, south-eastern part.

(*Original dated* 1933.)

Chart 1697.

this bay, in a depth of about 30 fathoms ($54^{m}9$), sand, southward of the mouth of the Djar Ketalang.

Kebola baai is deep and clear of dangers; the shores of the outer part are steep, but at the head the land descends to a low plain connecting the peninsula forming the north-western part of Alor to the main part of the island. This peninsula is mountainous, the highest peak being Monoembang (Monumbang), 2,969 feet ($904^{m}9$) high, about 5 miles north-eastward of Tanjong Koemba (*Lat. 8° 17′ S., Long. 124° 24′ E.*). Alor kechil, close north-eastward of Tanjong Koemba, and several other villages are situated on the northern side of the entrance to the bay. Anchorage can be obtained off Alor kechil.

Chart 2468, plan of Dulolong anchorage.

Anchorage may be obtained, in a depth of about 18 fathoms ($32^{m}9$), about one cable offshore, southward of Dulolong village, situated about 3 miles north-eastward of Tanjong Koemba.

Chart 1697.

Amaboe (Amabu), on the southern side of the bay and about 5 miles north-eastward of Tanjong Djalono, is fairly prominent.

There is safe anchorage for vessels with local knowledge in Reede Kalabahi, off Kalabahi village, on the northern side of Kebola baai, 7¾ miles north-eastward of Tanjong Koemba, in a depth of about 11 fathoms ($20^{m}1$), sand, about 2 cables offshore.

A light is occasionally exhibited from a wooden post at the root of the pier at Kalabahi.

Reede Kalabahi is bounded by the meridians of positions one mile eastward and one mile westward of the light-structure at the root of the pier.

Kalabahi is the residence of the Government official of the Alor eilanden. Boats should use the eastern side of the pier in the middle part of the day, as this is then the lee side. They cannot go alongside at low water. Water can be taken in from a pipe close westward of the pier. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and is known by this company under the name of Reede Alor.

About 1½ miles east-south-eastward of the pier is the entrance to a basin, about three-quarters of a cable wide, with depths of from 16 to 23 feet ($4^{m}9$ to $7^{m}0$); inside the basin there are depths of from 16 to 33 feet ($4^{m}9$ to $10^{m}1$), and it appears to be free of dangers. A vessel entering should keep on the southern side, as a reef extends from the northern side.

Tidal streams.—The tidal streams in Straat Pantar are of a semi-diurnal character, and are more regular than those in the straits farther westward. They are somewhat affected by the monsoons, although the west monsoon appears to have little influence. During the east monsoon the south-going stream predominates more in strength than in duration; sometimes during the period that the north-going stream should be running, especially from about 2 to 3 days after the quarters, a phenomenon known as "Ajer goendah" (uncertain water) occurs, owing to the north-going stream being unable to overcome the south-going monsoon current.

During the west monsoon the rate has never been known to exceed 4 knots. The maximum rate, from 6 to 7 knots, and sometimes even

9 knots, occurs during the east monsoon, and always with the south-going stream; this rate may be expected from about 2 to 3 days after full moon and new moon. From about 2 to 3 days after the quarters the maximum rate of the south-going stream is 4 knots, and, owing to the "Ajer goendah" the north-going stream is frequently not experienced. During the east monsoon the maximum rate of the north-going stream, from about 2 to 3 days after full moon and new moon, does not appear to exceed 3 knots. Heavy tide-rips, especially with a strong tidal stream, are found between Poera (*Lat. 8° 18′ S., Long. 124° 21′ E.*) and the entrance to Kebola baai, on the Alor shore.

Sufficient observations have not been taken to determine definitely the times at which the tidal streams change, especially as they are very irregular, but the following information may be useful:—

West monsoon.—In the northern part of the strait there is usually a north-going stream about 0 hrs., 2 hrs., and 4 hrs. after the moon's passage; the maximum rate, 4 knots, usually occurs 2 hrs. after the moon's passage, westward of Réta and Ternate. About 6 hrs., 8 hrs., and 10 hrs. after the moon's passage there is usually a south-going stream; the maximum rate, 4 knots, generally occurs 6 hrs. after the moon's passage, westward of Réta and Ternate.

In the southern part of the strait there is usually a north-going stream from about 2 hrs. before to 2 hrs. after the moon's passage; the maximum rate, 4 knots, usually occurs 2 hrs. before the moon's passage, south-eastward of Poera. About 4 hrs., 6 hrs., and 8 hrs. after the moon's passage there is usually a south-going stream; the maximum rate, 4 knots, generally occurs about 4 hrs. after the moon's passage, south-eastward of Poera.

East monsoon.—In the northern part of the strait there is usually a north-going stream from about 2 hrs. before to 2 hrs. after the moon's passage; the maximum rate, 1½ knots, generally occurs 2 hrs. after the moon's passage, westward of Réta and Ternate. During this period the "Ajer goendah" may be expected. From about 4 hrs. to 6 hrs. after the moon's passage there is usually a south-going stream; the maximum rate, 4 knots, generally occurs in the middle of this period, westward of Réta and Ternate.

In the southern part of the strait there is usually a north-going stream from about 2 hrs. before to from 2 hrs. to 4 hrs. after the moon's passage; the maximum rate, 2½ knots, generally occurs 2 hrs. after the moon's passage, southward of Poera, and the "Ajer goendah" may be expected during this period. From about 4 hrs. to 10 hrs. after the moon's passage there is usually a south-going stream; the maximum rate, 9 knots, generally occurs 6 hrs. after the moon's passage, south-eastward of Poera.

It will be observed that, in both monsoons, there is thus always a south-going stream throughout the entire strait at 6 hrs. after the moon's passage.

North coast of Alor.—The mountains within the northern coast of Alor are tolerably high, but have very few noticeable summits. The peninsula forming the north-western part of the island appears separated from a distance; Monoembang, the highest summit of this peninsula, and Pitoembang (Pitumbang), 6½ miles east-north-eastward, are easily identified. Piek van Kolana, the middle and highest summit of a long ridge occupying the eastern end of Alor, is 6,031 feet (1,837^{m}9)

Chart 1697.

high, and very prominent; about 8 cables west-south-westward of this peak is a shoulder 5,850 feet (1,783^{m}1) high; *see* view facing page 327.

The coast from Tanjong Matari (*Lat. 8° 08′ S., Long. 124° 29′ E.*), the north-western extremity of Alor, until near Tanjong Sika, about 7 miles eastward, is high and rocky; Tanjong Batoe Boerang, about one mile eastward of Tanjong Matari, is noticeable owing to its white colour. Sika is a low islet, covered with shrubs, lying on the coastal reef extending about one mile north-eastward from Tanjong Sika; a 3¼-fathom (5^{m}9) patch lies about one mile eastward of Sika. A group of trees stands on the coastal reef about 2 miles westward of Tanjong Sika. Telok Kele Waë, about midway between Tanjong Matari and Tanjong Sika, affords temporary anchorage for vessels with local knowledge, in a depth of 31 fathoms (56^{m}7), sand, about one cable offshore.

Telok Benlelang, entered between Sika and Tanjong Likiewatang, about 4 miles south-eastward, is foul on its western side, and elsewhere the depths are too great for anchoring; Kali Benlelang flows into the head of the bay. A road from Kalabahi runs through the low plain at the head of Telok Benlelang and thence along the north coast of Alor. Likiewatang village is situated on Tanjong Likiewatang.

Charts 1697, 3244.

The north coast of Alor eastward of Tanjong Likiewatang is high and steep over the greater part. Tanjong Limboer (Limbur) is a low point about 5 miles eastward of Tanjong Likiewatang, and temporary anchorage can be obtained by vessels with local knowledge about half a mile westward of it, in a depth of 27 fathoms (49^{m}4), sand; there are no good anchorages along the north coast. Tanjong Kolowale, about 1½ miles eastward of Tanjong Limboer, and Tanjong Babi, about 11 miles farther eastward, are high and rocky; Babi, a mountain, 2,855 feet (870^{m}2) high, rises close southward of the latter point. Tanjong Selaka, about 5 miles eastward of Tanjong Babi, has a hill on it, 797 feet (242^{m}9) high. Tanjong Manamoni, the north-eastern extremity of Alor, is hilly.

East coast of Alor.—The east coast of Alor, between Tanjong Manamoni and Tanjong Laisoemboe (Laisumbu), about 11 miles southward, is clear, and can be approached fairly closely, but the tidal streams are strong and irregular. Tanjong Ikiraka, about 1½ miles southward of Tanjong Manamoni, is a rocky point covered with vegetation; the mouth of Kali Melèkeh, which river flows through a low plain about one mile southward of Tanjong Ikiraka, is noticeable. Kolana village, the residence of the native chief of the district, is situated about 5 miles southward of Tanjong Ikiraka.

Kali Mauboekon flows out about 1¾ miles northward of Tanjong Laisoemboe (*Lat. 8° 19′ S., Long. 125° 08′ E.*), and its mouth can be identified by a group of casuarina trees. Anchorage can be obtained by vessels with local knowledge, in a depth of 27 fathoms (49^{m}4), sand, about 1½ cables offshore, with the clump of trees bearing 270°. This is the only anchorage off the east coast of Alor.

South coast of Alor.—The south coast of Alor, between Tanjong Marget and Tanjong Laisoemboe, has no outlying dangers and can be approached closely everywhere. Although the bottom is steep, anchorage can be obtained off most of the villages by vessels with local knowledge, in depths of from 22 to 28 fathoms (40^{m}2 to 51^{m}2), from

Charts 942a, 2759a.

Charts 1697, 3244.

about 2 to 3 cables offshore. The mountains within this coast have no distinctive features, except Apingemanna, about 11 miles westward of Tanjong Laisoemboe; Piek van Kolana, about 9 miles north-westward of Tanjong Laisoemboe and described with the northern coast of Alor on page 328, is also prominent from southward. *See* view facing page 327.

Chart 1697.

The western half of the south coast of Alor, between Tanjong Marget and Tanjong Maraoe, about 18 miles eastward, is mostly high and steep. Eastward of Tanjong Maraoe it consists mainly of relatively low spurs from the mountains, indented in places by ravines penetrating far inland, and forming more or less bare plateaux, steep on the seaward side. Koei (Kia) village, about 9 miles eastward of Tanjong Marget, and Poeréman (Pureman) village, nearly 11 miles westward of Tanjong Laisoemboe, are the residences of the native chiefs of the respective districts; Koei can be identified by two white tombs on a rocky eminence near the village.

Charts 942a, 2759a.

CHAPTER XI

SAWOE EILANDEN, TIMOR AND WÈTAR, WITH ADJACENT ISLANDS AND PASSAGES

Chart 942a.

SAWOE EILANDEN.—Sawoe (Savu) eilanden lie about 50 miles east-south-eastward of the eastern end of Soemba (page 238), and consist of the islands Sawoe (Savu) Rai Djoea (Rai Jua) and Dana. The islands are comparatively low, Sawoe, the highest, only attaining an elevation of about 1,100 feet ($335^{m}3$) in its south-western part. Seba, the capital of the group, is situated on the north-western coast of Sawoe.

The inhabitants of the group have a language of their own, which bears some resemblance to that used by the natives of Soemba ; Malay is only slightly understood. A good breed of horses, goats, sheep, and pigs is found on the islands ; rice and maize are cultivated. Fishing is only carried out on the drying coastal reefs.

Climate and weather.—*See* page 17.

Dana.—Anchorage.—Dana (*Lat. 10° 50′ S., Long. 121° 17′ E.*), the south-western and smallest island of the group, is partly covered with low timber and is uninhabited. The eastern and highest part of the island rises to a rocky plateau, 118 feet ($36^{m}0$) high ; a prominent rock, 112 feet ($34^{m}1$) high, lies on the northern side.

Anchorage can be obtained by vessels with local knowledge, in a depth of 16 fathoms ($29^{m}3$), northward of the above rock, with the outer points of the island bearing 144° and 206° ; the best landing place is on the north-east coast, where there is a white sandy beach.

Rai Djoea.—Anchorages.—Rai Djoea, about 18 miles north-eastward of Dana, is inhabited and cultivated. Hanga, the highest hill, lies nearly in the middle of the island and is 558 feet ($170^{m}1$) high. Tanjong Woeimahi, the western extremity of Rai Djoea, is rocky on its northern side, but low and sandy on its southern side. Two large, prominent rocks lie close off the eastern part of the south coast.

There are three villages on the north coast : Merapo, situated close eastward of Tanjong Meranga, the north-western extremity of the island, Oedjoeh Dima, where the Rajah resides, and Namo. In the South-east monsoon anchorage can be obtained by vessels with local knowledge off Namo, in a depth of 20 fathoms ($36^{m}6$), sand, nearly 3 cables offshore, with Mereboe, a noticeable conical summit on

Charts 475, 2759a.

Chart 942a.

the southern side of Sawoe, in line with Tanjong Beh, the north-eastern extremity of Rai Djoea, bearing 094°, and a 253-foot (77^{m}1) hill, southward of the village, in line with a white sandy path running inland from the beach, bearing 194°. With offshore winds landing can be effected near this path, and also at Merapo village, where there is an opening in the coastal reef.

There is also anchorage, for vessels with local knowledge, northward of Tanjong Woeimahi, in a depth of 19 fathoms (34^{m}7), sand and coral, about half a mile offshore, with a prominent sugarloaf-shaped hill, 197 feet (60^{m}0) high, close to the coast about half a mile south-westward of Tanjong Meranga, bearing 063°, and Tanjong Woeimahi bearing 186°; this anchorage is sheltered from easterly winds. There are no good anchorages off the south coast of Rai Djoea.

Sawoe.—Anchorages.—Sawoe is separated from Rai Djoea by Straat Rai Djoea (Jua), which is about 3½ miles wide and is clear of dangers and deep in the fairway. Rai Piga, 1,122 feet (342^{m}0) high and the highest peak on Sawoe, lies about 8 miles eastward of Tanjong Mesara, the western extremity of the island. Tanjong Mesara is a rocky, wooded point, rising gradually inland.

In numerous places along the coast of Sawoe, where there is a coastal reef, the outer edges of it are raised by pieces of dead coral, forming dams which dry at low water, and fishing is carried out in the basins within them; in the evenings, especially at spring tides, torches are used for this purpose, and hundreds of lights are thus often seen along the coast.

Tanjong Pederoh, about 4½ miles south-eastward of Tanjong Mesara, is a rocky point, 108 feet (32^{m}9) high; between these two points is a sandy beach about 2½ miles in length. Two rocks, which dry, lie about 4 cables southward of Tanjong Pederoh, but these are the only dangers outside the coastal reef around the entire island. About one mile north-westward of Tanjong Pederoh is an opening in the coastal reef, where boats can generally land. Between Tanjong Pederoh and Tanjong Mereboe (Merebu) (*Lat. 10° 37′ S., Long. 121° 50′ E.*), about 5½ miles eastward, the coast forms a slight indentation with a sandy beach, named Telok Oeba Maka. There is a noticeable white patch near the coast about one mile north-eastward of Tanjong Pederoh; on the coastal reef about 3 miles eastward of this point is a very prominent black rock, named Géla Ngelaloe, with a raised part in the middle like a chimney. Tanjong Ege is a low, rocky point, about 1½ miles eastward of Tanjong Mereboe. About three-quarters of a mile north-eastward of Tanjong Ege is a small inlet with a sandy beach; landing can generally be effected by the mouth of a rivulet, on which Ege village is situated, flowing into the western part of this inlet.

Tanjong Poedi Eta, nearly 4 miles north-eastward of Tanjong Ege, is a rocky point of a reddish colour; Wadoe Mea, a large rock above water, lies on the edge of the reef extending a short distance from this point. Between Tanjong Poedi Eta and Tanjong Lië Geta, nearly 5 miles north-eastward, the coast forms a slight indentation with a sandy beach, named Telok Deme; a group of three rocks lies on the coastal reef about midway between these two points.

Vessels with local knowledge may obtain good anchorage in the west monsoon, in a depth of 18 fathoms (32^{m}9), about 6 cables offshore,

Charts 475, 2759a.

Chart 942a.

with Tanjong Lië Geta bearing 067°, the group of three rocks, 257°, and a large rock on the beach about midway between these rocks and Tanjong Lië Geta, 317°. An isolated palm tree stands on Tanjong Lië Geta. In the west monsoon good anchorage can also be obtained between Tanjong Lië Geta and Tanjong Bali, 5½ miles northward, but the coastal reef extends as much as 8 cables offshore near the latter point.

Tanjong Nioewoedoe (Niuwudu), about one mile northward of Tanjong Bali, is low, sandy, and wooded; a large rock lies close to the coast about midway between these two points. About one mile westward of Tanjong Nioewoedoe is a remarkable cliff, formed of greyish-green masses of rock; at the western end of this cliff is Telok Lioe, a small indentation in the coast with a sandy beach.

Kali Menia.—Light.—Kali Menia flows out about 2¾ miles west-south-westward of Tanjong Aimaoe, the rocky northern point of Sawoe, and a sandy beach here affords a good landing place; Wawarei village is situated on a small plateau about half a mile inland.

A light is exhibited, at an elevation of 96 feet (29^{m}3), from a white stone pyramid, 26 feet (7^{m}9) in height, close eastward of the mouth of Kali Menia.

Chart 2468, plan of Seba road.

Reede Seba.—Light.—Anchorage.—Reede Seba is bounded by the arc of a circle described with a radius of 6½ cables from the light-structure, which is situated near the beach about 4 miles south-south-westward of the light-structure at Kali Menia.

A light (*Lat. 10° 29′ S., Long. 121°·50′ E.*) is exhibited, at an elevation of 52 feet (15^{m}8), from a white iron framework structure, 46 feet (14^{m}0) in height, at Seba.

The village of Seba, where the Rajah of Sawoe eilanden resides, is not easily seen from seaward; there is a white stone pyramid, 30 feet (9^{m}1) in height, standing close south-westward of the light-structure, but it is difficult to identify on account of a white building behind it.

Kota Boddo, a village situated on a small rocky plateau about three-quarters of a mile south-westward of the light-structure, is a very prominent mark. Kali Boddo discharges close north-eastward of the plateau.

Good anchorage may be obtained during the South-east monsoon, in a depth of 6½ fathoms (11^{m}9), mud and sand, nearly 4 cables offshore, with the light-structure or the white pyramid bearing 125°, and Kota Boddo rocky plateau bearing 185°; a patch, which dries, lies about 1½ cables south-eastward of this position, and, when approaching the roadstead, it must be borne in mind that the bottom rises very steeply. In the west monsoon it is better to anchor farther out, in a depth of about 19 fathoms (34^{m}7), at least 7 cables offshore. Landing can be effected in a gap in the coastal reef, by the light-structure.

Fresh meat and fruit are usually obtainable; in case of necessity good drinking water can be supplied from the reservoirs belonging to the Rajah, but permission must be obtained first. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 942a.

ROTI.—Roti, lying off the south-western end of Timor and with its western end about 50 miles east-south-eastward of the eastern end of

Chart 942a.

Sawoe, is a hilly island; traces of volcanic lava are found throughout the island, and the last eruption occurred in 1908, in the northern part. The highest part of the island is in about the middle of the southern side, where Ailai rises to an elevation of 1,457 feet (444^{m}1), but only a few of the summits are distinctive; Platte top, 630 feet (192^{m}0) high, lies about 12 miles eastward of Tanjong Tonga, the north-western extremity of the island, and 2 miles within the north coast; it is particularly noticeable from north-north-eastward by vessels bound for Baä (page 336). Lelebe, 879 feet (267^{m}9) high, about 4½ miles southward of the entrance to Korobafo baai (page 337) in the northern part of Roti, has a fairly prominent summit wooded with round-topped trees.

Roti is fringed in places by a fairly wide reef, outside which the depths generally increase rapidly, and off some portions of the south coast the 100-fathom (182^{m}9) line is less than half a mile offshore; the bottom is mostly sand and coral, covered in places by a layer of mud and clay.

The island is well populated, and the inhabitants are occupied with agriculture, breeding cattle, and fishing. A good road, with many branches running inland, runs round the entire island.

Western side of Roti.—Anchorages.—Off-lying islands.—The western side of Roti, between Tanjong Tonga and Tanjong Boa, about 10 miles south-south-eastward, is fringed by a reef extending about three-quarters of a mile offshore in places.

Noese (Nusa), an island 118 feet (36^{m}0) high, lies about 1½ miles westward of Tanjong Tonga. Doö, 46 feet (14^{m}0) high, and Dao, 187 feet (57^{m}0) high, lie about 2¼ miles southward and 4½ miles west-south-westward, respectively, of Noese. There is usually a heavy surf on the coastal reef fringing each of these three islands. If passing between these islands from southward, it is advisable to pass eastward of Doö and thence between this island and Noese (*Lat. 10° 47′ S., Long. 122° 46′ E.*). Vessels can also pass between Noese and the reef which extends 1½ miles north-westward and over half a mile westward from Tanjong Tonga, but this passage is barely 3 cables wide; if using it the Noese side should be held. Off the northern entrance to this passage is a bank on which a least depth of 6 fathoms (11^{m}0) was found; according to information from a pearl-fisher, however, there is a small 2¾-fathom (5^{m}0) patch on this bank. Good anchorage, in depths of from 8 to 11 fathoms (14^{m}6 to 20^{m}1), sand and coral, can be obtained by vessels with local knowledge either southward of Noese or eastward of the northern part of Dao, according to the direction of the wind. The tidal streams amongst these islands sometimes attain a rate of 3 knots.

Dana, about 1½ miles southward of Tanjong Boa, is a rocky island with a hill, 157 feet (47^{m}9) high, in the northern part; there is always a heavy swell and a turbulent sea off the southern side of the island. Haliana, about one mile north-eastward of Dana, is a steep, rocky islet, 348 feet (106^{m}1) high. The depths around Haliana, and between Dana and Roti, are very irregular.

South-eastern side of Roti.—Landoe (Landu), an island, with two hills on it, 341 and 285 feet (103^{m}9 and 86^{m}9) high, respectively, lies about 5 miles eastward of Tanjong Boa, and is separated from Roti by Straat Manoekaka, which is very narrow and not navigable, as

Charts 475, 2759a.

Chart 942a.

the western entrance is foul, and a reef, which dries, lies in the middle of the eastern part.

Chart 2468, plan of Buka bay.

Boeka baai.—Dangers.—Boeka (Buka) baai lies on the southern side of Roti, immediately eastward of Tanjong Makar, the extremity of a tongue of land on the northern side of the eastern end of Straat Manoekaka. Manoek (Manuk), an island, 167 feet ($50^{m}9$) high at its western end, is connected to Tanjong Makar by a reef which dries; the island is fringed by a reef on which are several low islets and rocks; the outermost rock, lying on the eastern edge of this reef, about 1¾ miles eastward of Manoek, is a useful mark when entering the bay. Lai, an islet close off the northern shore of the bay and about 4 miles north-eastward of Manoek, is fringed by a reef, which dries, extending about half a mile south-eastward. Batu Teloe (Telu), about one mile south-westward of Lai, consists of a few rocks on the southern side of a large reef. Karang Makemoe (Makemu) is a horse-shoe-shaped reef, which dries, about 1½ miles westward of Batu Teloe, and thence a line of reefs extends westward to the head of the bay. The shores of the bay are fringed by a broad reef of sand and coral, which dries; Toea, a small islet with a white stone pyramid on it, lies on this reef nearly 1½ miles westward of Tanjong Manoelaloek (Manulaluk), a steep point on the northern side of the bay, about 3¾ miles north-eastward of Tanjong Makar.

Anchorage.—Directions.—A vessel approaching Boeka baai should steer for the white pyramid on Toea, bearing 312°, which leads between the reefs extending from Manoek and Batu Teloe; when the low wooded southern extremity of Lai is in line with Batu Teloe, bearing about 068°, the vessel should alter course northward, and when the southern extremity of Lai bears 090°, she should alter course sharply westward and keep this point astern on that bearing, passing northward of Karang Makemoe, and anchoring when the white pyramid on Toea bears 337°, in a depth of 11 fathoms ($20^{m}1$), mud and sand. This anchorage is safe under all conditions, as it is sheltered from south-eastward by Karang Makemoe and the reefs lying westward of it; the depths decrease gradually towards the coastal reef.

Charts 3296, 942a.

Coast.—Between Lai (*Lat. 10° 52′ S., Long. 123° 04′ E.*) and Tanjong Poeleh (Puleh), a low, rocky point about 10 miles east-north-eastward, the coast is high and steep, and the depths are too great for anchoring; thence Tanjong Piakokoli, about 16 miles north-eastward, the coast is low, uninhabited, and rocky in places, the land behind rising steeply. A prominent pillar-shaped rock lies on the coast about 3¼ miles north-north-eastward of Tanjong Poeleh, and a 9-fathom ($16^{m}5$) patch lies about three-quarters of a mile south-eastward of this rock, but there are no dangers outside the 5-fathom ($9^{m}1$) line off this part of the coast.

Besides Ailai (page 334), Pepelelain, 787 feet ($239^{m}9$) high, situated near the coast about midway between Tanjong Poeleh and Tanjong Piakokoli; and Lakimola, 896 feet ($273^{m}1$) high, about 4½ miles westward of Tanjong Piakokoli, are noticeable.

Chart 3296.

Eastern side of Roti.—Anchorages.—The eastern coast of Roti,

Charts 475, 2759a.

Chart 3296.

between Tanjong Piakokoli and Tanjong Poekoeatoe (Pukuatu), the northern extremity of the island, has no distinctive features when seen from a distance; the hilly island Oesoe (Usu), separated from this coast by Selat Oesoe (Usu), a narrow strait, is difficult to distinguish from the main island.

Telok Pepela is entered between Tanjong Batoeisi (Batuisi), nearly 3 miles northward of Tanjong Piakokoli, and Tanjong Lioedese (Liudese), the southern extremity of Oesoe, and the same distance farther northward. The depths in this bay are very irregular, and vessels entering it should exercise the utmost caution. There is good anchorage, in a depth of 13 fathoms (23^{m}8), sheltered from westerly winds, in an inlet in the coastal reef on the southern side of the entrance; a vessel should approach this anchorage with Lakimola hill bearing 221°, anchoring when a flat hill at the head of the bay is in line with Batu Loeak (Luak), a large rock on the drying coastal reef on the western side of the inlet, bearing about 274°.

The east coast of Oesoe is steep and rocky; Tanjong Okabibi, 5 miles north-eastward of Tanjong Lioedese, should be given a wide berth, as the coastal reef projects some distance, and a 5-fathom (9^{m}1) patch lies nearly one mile south-eastward of this point. Selat Oesoe is encumbered with islets and dries in the southern part, and also over a small portion in the northern part. In the west monsoon good anchorage can be obtained in the northern entrance, between Tanjong Nakai, about 6 cables north-north-westward of Tanjong Okabibi, and Tanjong Mondo, 1½ miles farther north-westward, in a depth of 14 fathoms (25^{m}6).

Chart 942a.

North-western side of Roti.—The coast between Tanjong Tonga (page 334) and Baä, 14½ miles east-north-eastward, is fringed by a reef, which extends over one mile offshore in places. Batu Perahoe, a small rock covered with vegetation, lies on the coastal reef about 3 cables north-westward of Tanjong Hoendihoek, about midway between Tanjong Tonga (*Lat. 10° 47′ S., Long. 122° 49′ E.*) and Baä. The three islets Kodi, Dao, and Aianah lie on the coastal reef within a distance of 3½ miles eastward of Tanjong Hoendihoek; Koda is 157 feet (47^{m}8) high and rocky; Dao and Aianah are thickly wooded and 46 feet (14^{m}0) high.

Chart 2468, plan of Baä road.

Reede Baä.—Lights.—Reede Baä, off Baä village, is bounded by the arc of a circle described with a radius of 8½ cables from the light-structure.

A light is exhibited, at an elevation of 49 feet (14^{m}9), from a white iron framework structure, 46 feet (14^{m}0) in height, situated on the beach at Baä.

A light is occasionally exhibited on the head of the pier.

The best anchorage, which is safe during the South-east monsoon, is in depths of from 11 to 14 fathoms (20^{m}1 to 25^{m}6), mud and sand, with the light-structure bearing 148°; a rocky spur from Batu Termanoe (Termanu), (chart 3296), a hill on the coast about 4 miles north-eastward of Baä, is then just visible behind a rocky point with a white patch on it about 2½ miles north-eastward of Baä; a white stone beacon on a hill, 295 feet (89^{m}9) high, about 3¾ cables south-eastward of the light-structure, should be in line with a small stone

Charts 475, 2759a.

Chart 2468, plan of Baä road.

wall, with a door in the middle, on the beach. Additional landmarks are a white stone pyramid on the drying coastal reef about one mile westward of the light-structure, and a hill, 226 feet (68^{m}9) high, on a point about 1½ miles north-eastward of Baä.

Baä is the headquarters of a Government official, whose house, with a flagstaff, stands near the light-structure. At high water the best landing place is at a pier about three-quarters of a cable eastward of the light-structure with steps at the head, where there is a depth of 3¼ feet (1^{m}0), and at other times on the drying coastal reef close eastward. Provisions in small quantities are obtainable; very good drinking water can be obtained from a well near the house of the Government official. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3296.

Coast.—Batu Termanoe is a prominent rocky hill resembling a castle, and about one mile south-south-eastward of it is a flat-topped hill, 512 feet (156^{m}1) high. Batu Hoen is a rocky islet, 207 feet (63^{m}1) high, lying on a projecting part of the coastal reef about half a mile north-eastward of Batu Termanoe.

Chart 2468, plan of Korobafo bay.

Korobafo baai.—Anchorage.—Korobafo baai, entered between Tanjong Oenggae (Unggae), about 8 miles north-eastward of Batu Termanoe, and Tanjong Lean, about 8 cables farther north-eastward, is frequently difficult to identify. Each of these points is fringed by a reef, and Batu Noesalai (Nusalai), a coral reef, which nearly dries in places, lies off the entrance. The bay should be entered by the passage between Batu Noesalai and Tanjong Lean, but with high-water levels there is frequently a strong current in the funnel-shaped entrance.

Near Tanjong Batoepadalean (Batupadalean), about 1¼ miles south-eastward of Tanjong Lean, the passage narrows to about one cable, and then broadens out to a very sheltered basin with fairly regular depths of from 5 to 11 fathoms (9^{m}1 to 20^{m}1), affording excellent anchorage; there is a landing place on the southern shore of the basin. From Tanjong Bongama (*Lat. 10° 36′ S., Long. 123° 14′ E.*), at the eastern end of the basin, a narrow passage, barely half a cable wide in places and about one mile in length, leads between more or less rocky shores to an inner basin; owing to the strong current, however, this passage is only navigable for small vessels. Over a small portion at the western end of the inner basin there are depths of over 5 fathoms (9^{m}1), but elsewhere it is very shoal, with banks, which dry, extending from the shores.

Chart 3296.

Coast.—The coast between Tanjong Lean and Tanjong Poekoeatoe (page 336) is low and wooded, with occasional long portions of rocky cliffs, the whole being fringed by a reef. The rocky islet Bibi lies about 3 miles south-westward of Tanjong Poekoeatoe and close northward of a projection of the coastal reef, which here extends about 1¼ miles offshore. Anchorage can be obtained about 1½ miles westward of Tanjong Poekoeatoe, on a sandbank, in depths of from 6 to 9 fathoms (11^{m}0 to 16^{m}5).

STRAAT ROTI.—Dangers.—Straat Roti, separating Roti from the south-western end of Timor and Semaoe (Semau), is deep and

Charts 942a, 475, 2759a.

Chart 3296.

clear, except for the few dangers described below. The tidal streams may run with some strength through the strait, and there is frequently a turbulent sea in the eastern part.

The south coast of Timor, forming the northern side of Straat Roti, consists of hilly land with no noticeable features; parts of this coast are rocky. Tanjong Mali is a narrow, rocky point from which a spit extends, about 9 miles eastward of Tanjong Oisina, the south-western extremity of Timor; it should not be approached within a distance of one mile. Telok Sakala, a slight indentation in the coast eastward of Tanjong Mali, affords anchorage, with offshore or light winds, in a depth of 15 fathoms (27^{m}4).

Beatrice rocks, 8½ miles southward of Tanjong Mali, consist of two coral reefs about 2¼ miles apart, the western reef, with a depth of 4 fathoms (7^{m}3) over it, and the eastern, with 3 fathoms (5^{m}5); they are usually marked by discoloration, surf, or tide-rips. The southern sides are steep-to, but anchorage can be obtained off the northern sides, if necessary, in a depth of 10 fathoms (18^{m}3). The depths between the western reef and Roti are very irregular.

A rock, with a depth of less than 6 feet (1^{m}8) over it, lies about 2¾ miles northward of the eastern Beatrice rock.

A narrow coral bank, over which there is a least depth of 9 fathoms (16^{m}5), lies about 2 miles south-south-westward of Tanjong Oisina; it is advisable to give this point a berth of at least 3 miles, as it is possible that less depths may exist.

Chart 942a.

TIMOR.—Timor, the largest of the Kleine Soenda eilanden, lies in an oblique direction to the chain of volcanoes extending from Java to Banda, and its geological formation is very different; there appears to be volcanic action, as cold craters are found at numerous high elevations. A rugged range of mountains runs the entire length of the island; the Ramelau mountains (*Lat. 8° 54′ S., Long. 125° 29′ E.*) lie in about the middle of the island and are the highest part of this range, Tata Mai Lau (Fatamailau), one of the peaks, attaining an elevation of 9,577 feet (2,919^{m}1).

During the South-east monsoon, when there is very seldom any rain, the land appears bare and scorched, whilst the rivers and streams are dry. The North-west monsoon, which is usually accompanied by squalls and heavy showers, quickly alters the aspect; the mountain slopes present a fresh green appearance, the temperature drops, and the rivers become wild mountain torrents. During the North-west monsoon bright green discolorations, giving the impression of reefs, are often found far out from the coast; these are, however, caused by discharge from the mountain streams.

The north-west coast is thickly populated, but there are few inhabitants on the south-east coast. The inhabitants live by agriculture and cattle breeding; fishing is carried out on the drying coastal reefs and along the coasts, especially at low water and in the evenings, when torches are used.

The south-western half of the island is Netherlands territory, while the north-eastern half belongs to Portugal. Koepang (page 344) is the principal village of the former, and Dilly (page 350) is the capital of the latter. The native population of Portuguese Timor, in 1938, was about 500,000.

Charts 475, 2759a.

Chart 942a.

Portuguese Timor may be divided agriculturally into three zones; the dry and arid north and east section, covered with jungle scrub, and unsuitable for agriculture; the central mountain region with grassy slopes, little suitable for cultivation; and the elevated plains in the middle section of the south coast. The products include rice, maize or corn, European fruit and vegetables, tobacco, copra, tea and oranges. There are buffalo, goats, pigs, deer and fowls.

There is occasional communication by steamer with Portugal, and also with Darwin, in Australia.

Climate.—The climate of Timor resembles that of North Australia. The North-west monsoon brings with it heavy rains and overcast weather, which is very detrimental to European constitutions; during the South-east monsoon the climate is dry and pleasant.

SOUTH-EASTERN SIDE OF TIMOR.—Coast.—The south-east coast of Timor can be approached fairly closely throughout, as there are no off-lying dangers. There are, however, no bays or harbours which afford shelter in the South-east monsoon, and this coast is seldom visited. Nearly all the rivers are inaccessible in the dry season, and, even in the North-west monsoon, there is frequently a heavy surf, so that landing is difficult.

The action of the surf on soft white rocks on the coast causes a whitish discoloration of the sea in some places. Patches of this discoloration are carried by the current for miles seaward. In the North-west monsoon patches of bright green discoloration, caused by the flooded rivers, may be seen in the offing, and may give the impression of reefs.

Noilmina baai.—Tanjong Batoe Poetih (Batu Putih), about 38 miles eastward of Tanjong Oisina, is a steep, white rocky cliff, 164 feet ($50^{m}0$) high, and is very prominent, especially from eastward. Noilmina baai is a wide bight immediately north-eastward of this point, and has a low sandy shore over the greater part. The south-western part of the bay is backed by hilly land, but within the north-eastern part there is a low plain, through which the Noil Mina and several streams flow; this plain is backed north-eastward by a ridge of mountains terminating northward in Fatoe Bonino, 3,475 feet ($1{,}059^{m}2$) high, situated about 21 miles north-eastward of Tanjong Batoe Poetih.

In the North-west monsoon there is fairly sheltered anchorage for vessels with local knowledge in the south-western part of the bay. A vessel should approach with a prominent mass of rocks on the beach, nearly one mile northward of Tanjong Batoe Poetih, bearing 317°, and anchoring in depths of from 3 to 5 fathoms ($5^{m}5$ to $9^{m}1$); the bottom rises very gradually towards the shore. In the South-east monsoon the shore should not be approached closely.

Noil Mina flows out about 2¼ miles north-north-eastward of Tanjong Batoe Poetih (*Lat. 10° 13′ S., Long. 124° 05′ E.*) between two sand spits, which dry, on which there is often a heavy surf; off the mouth is a bar, which can be crossed by boats except at low water. Just within the bar the western side of the entrance is rocky, and the depths increase to 4½ fathoms ($7^{m}8$), but decrease a short distance within to 1½ fathoms ($2^{m}7$). For about 2 or 3 miles from the mouth the river is only separated from the sea by a narrow tongue of land covered with

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Chart 942a.

mangroves, and a portion of this tongue eastward of the mouth is sometimes broken through during floods in the North-west monsoon.

Chart 1697.

Kalbano baai.—Kalbano baai is a slight indentation in the coast about 30 miles east-north-eastward of Tanjong Batoe Poetih; the shore consists of a steep, shingly beach, except in the southern part, where there is a narrow coastal reef, which dries. A summit, 3,153 feet ($961^{m}1$) high, lies about 7 miles west-south-westward of Kalbano village; from this summit a ridge, from about 1,650 to 1,970 feet ($502^{m}9$ to $600^{m}4$) high, extends about 9½ miles north-eastward, gradually approaching the northern shore of the bay, where it terminates in a summit, 1,592 feet ($485^{m}3$) high.

Kalbano village stands about 3½ cables inland, behind groves of palm trees along the western shore of the bay, whence the land rises to the ridge described above. There is a noticeable mass of rock on the beach at the northern end of the palm trees.

Good anchorage can be obtained by vessels with local knowledge about 3 cables eastward of the northern end of the drying coastal reef, in depths of from 11 to 33 fathoms ($20^{m}1$ to $60^{m}4$); there is a good landing place immediately northward of the coastal reef.

Coast.—Noil Toeké (Tuke), a mountain stream, flows through a steep gap in the mountains immediately north-eastward of Kalbano baai; the mountains on the north-eastern side of this gap are considerably higher than those south-westward, and include Loenoe (Lunu), 4,577 feet ($1{,}395^{m}1$) high, about 9 miles north-north-eastward of Kalbano village, and Amanatoe, 3,478 feet ($1{,}060^{m}1$) high, about 2¾ miles eastward of Loenoe. Menasi, 1,916 feet ($584^{m}0$) high, 8½ miles northward of Amanatoe, is easily identified as a small cone in the range.

Tanjong Batoe (Batu) Merah, about 12 miles north-eastward of the mouth of Noil Toeké, is a high rocky point, formed by a spur from the mountains; between the gap and Tanjong Batoe Merah the coast in many places consists of cliffs, on which there are remarkable red and white patches; north-eastward of this point the mountains gradually recede from the coast, leaving a wide, low plain, extending to beyond the mouth of Mota Massin, about 32 miles north-eastward. The coast is bordered by a fairly steep sandy beach, behind which, for the greater part, there are casuarina trees. Tanjong We Toh is the low southern entrance point of Mota Besikama, which flows through a mudbank about 20 miles north-eastward of Tanjong Batoe Merah. This river, sometimes known as Mota Benain, is the largest river in Netherlands Timor. A small mudbank, which dries, lies off its mouth. The river dries in the South-east monsoon, but is navigable by native craft for a short distance during the North-west monsoon.

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Mota We Deliek, with innumerable branches and creeks in the marshy land, flows out about 5 miles northward of Tanjong We Toh (*Lat. 9° 38′ S., Long. 124° 59′ E.*), into a slight indentation in the coast, known as Maoebesi (Maubesi) baai. There was a depth of 10 feet ($3^{m}0$) in 1927 on the bar off the mouth of this river at mean water level, enabling small vessels to enter at high water, although it is advisable to mark the channel previously; within the bar there is a least depth of 15 feet ($4^{m}6$) at mean water level, over a distance of 7 miles. Anchorage can be obtained anywhere off this part of the coast, but it is

Charts 475, 2759a.

Charts 3244, 1697.

uninhabited. Mota Massin is navigable for praus in the west monsoon, but dries in the South-east monsoon.

Charts 3244, 942a.

Tanjong Tafara, about 7½ miles east-north-eastward of the mouth of Mota Massin, is a low point which may be identified by some casuarina trees, and terminates in a bank of shingle. The mountains approach nearer the coast here. Cassa Bauca, 1,096 feet (334^{m}1) high, lies nearly 5 miles north-westward of Tanjong Tafara; Foho Rem, 1,867 feet (569^{m}1) high and about 9 miles north-westward of Tanjong Tafara, is, however, more noticeable. Taroman, 5,725 feet (1,745^{m}0) high, lies about 12½ miles north-north-westward of Tanjong Tafara; Tata Mai Lau, the highest peak of the Ramelau mountains (*see* page 338), lies about 28 miles north-eastward of Taroman, and is separated by a deep gap from Cablak mountains south-eastward.

Aitutu, 4,918 feet (1,499^{m}0) high, and the very sharp peak Samora, 5,876 feet (1,791^{m}0) high, lie about 17 and 23 miles, respectively, east-north-eastward of Tata Mai Lau. On the slopes of Samora there is a noticeable white military post, named Fatoe Berlioe, standing at an elevation of 1,907 feet (581^{m}2). The mountainous land continues north-eastward.

Chart 3244.

Tanjong Suaio (Soeai), about 5½ miles north-eastward of Tanjong Tafara, is a low point fringed by a reef which extends about 3 cables offshore; anchorage can be obtained by vessels with local knowledge, in a depth of 15 fathoms (27^{m}4), off the south-western side of this point. Tanjong Lalete, about 26 miles north-eastward of Tanjong Suaio, is low and marshy. Betano, about 2½ miles north-eastward of Lalete, can be identified by a Custom house and a beacon; landing can be effected here within a projecting tongue of the coastal reef, but there is a heavy surf with winds from seaward. Anchorage may be obtained, in a depth of 11 fathoms (20^{m}1), with the beacon bearing 355°, and the point eastward, 076°. Close north-eastward of Betano are two summits, 1,486 feet (452^{m}9) and 1,391 feet (424^{m}0) high, respectively; there is a prominent tree on the south-western and higher of the two. The coast between Betano and Tanjong Meti Boot, about 5½ miles eastward, is fringed by a reef in places.

Tanjong Loeka, about 31 miles east-north-eastward of Tanjong Meti Boot, is a low point fringed by a reef. A small settlement, named Ro Falin, stands about 2¾ miles westward of this point and consists of a few huts on the beach; landing can be effected here under favourable conditions. This place is of some importance, as a path leads through a marshy tract to Loeka village, situated a short distance inland and the centre of some rubber plantations. A mountain, 1,391 feet (423^{m}9) high, with a prominent tree on its summit, lies about 5 miles northward of Ro Falin (*Lat. 8° 58′ S., Long. 126° 15′ E.*).

Ponta Beaco is a low point about 10½ miles eastward of Tanjong Loeka. Beaco village is situated about 1½ miles westward of Ponta Beaco, and may be identified by the Custom house and a white pillar. Anchorage may be obtained by vessels with local knowledge in a convenient depth here, approaching the coast with the pillar bearing 024°; in the South-east monsoon, however, there is a heavy swell. This landing place consists of a short sandy beach between reefs which dry, and is one of the most important on the south-east coast of Timor,

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Chart 3244.

as the rich, well-populated Viqueque district lies inland; a good road leads from Beaco to Viqueque, the capital of the district, situated about 8 miles north-westward.

The coast between Ponta Beaco and Ponta Lore, about 36 miles east-north-eastward, is hilly, with high mountains rising behind; the most prominent of these are Mundo Perdido, 5,871 feet (1,789^{m}4) high, about 16 miles north-north-westward of Ponta Beaco, and Boikau, 7,582 feet (2,314^{m}0) high, the highest peak of Serra Mata Bia, situated about 20 miles north-north-eastward of Ponta Beaco (*Lat. 8° 57′ S., Long. 126° 29′ E.*).

This part of the coast is more populated than that south-westward of Ponta Beaco, as the forests produce excellent timber, and there are numerous sawmills. Tanjong Roro Ai, about 12 miles north-eastward of Ponta Beaco, is a high, rocky point formed by a spur from Serra Mata Bia; Aliambata village, where a petroleum company was established in 1930, is situated about one mile westward of Tanjong Roro Ai, and a good road connects the village with Viqueque.

The village can be identified by a large pyramid. Anchorage may be obtained, in a depth of about 10 fathoms (18^{m}3), with the pyramid bearing 333° and Tanjong Roro Ai, 067°.

The depth is reported to be 20 fathoms (36^{m}6) at a distance of 8 cables offshore, and 9 fathoms (16^{m}5) at 4½ cables.

Tanjong Oka Ona, about 12½ miles eastward of Tanjong Roro Ai, is a low sandy point with a rock off it. Elomar village is situated on the shore of a small bay nearly 3 miles westward of Tanjong Oka Ona; a reef, which dries, extends from the eastern shore of this bay, but off the village is a broad sandy beach, affording good landing. Two pillars, in line bearing 026°, lead to the anchorage, in a depth of about 4 fathoms (7^{m}3). Tanjong Batoe Poetih, about one mile eastward of Tanjong Oka Ona, consists of white rocks.

Silvicola (Saenamo) village, the landing place for Lore, situated a short distance inland, and the centre of the timber trade, stands close westward of the low Ponta Lore. The house of the manager of the sawmills, situated at an elevation of about 40 feet (12^{m}2), north-westward of Ponta Lore, is very prominent.

A channel, about half a mile wide, leads through the wide coastal reef to the landing place, which is sheltered in both monsoons. Two pillars near the beach, in line bearing 350°, lead through the middle of this channel.

Small craft can anchor inside the channel, and the water here is always calm, even when there is heavy surf on the edge of the coastal reef. Anchorage may be obtained, in a depth of about 10 fathoms (18^{m}3), with the pillars, in line, bearing 350°, and Ponta Lore, 084°.

The coast north-eastward of Ponta Lore is fringed by a sandy beach for the first few miles, but nearing Tanjong Ile Hoi, 12½ miles north-eastward of Ponta Lore, it becomes rocky and continues thus to the north-eastern extremity of Timor. North-eastward of Tanjong Ile Hoi (*Lat. 8° 32′ S., Long. 127° 10′ E.*), the high, rugged mountains approach the coast; Paichao, the highest of these, is a very sharp peak, 3,196 feet (974^{m}2) high. There is a noticeable cleft in the hills near the coast about 2 miles south-westward of Tanjong Ile Hoi. *See* view facing this page.

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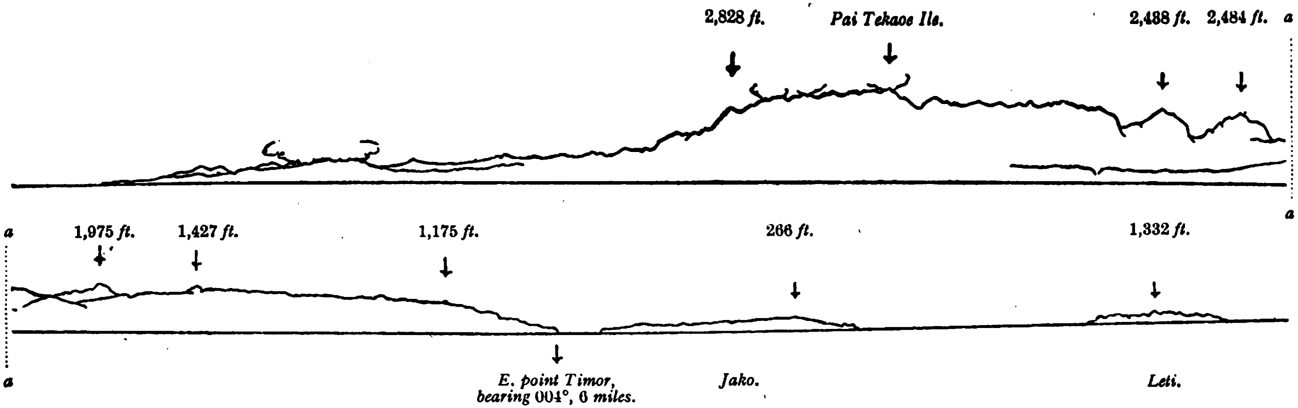
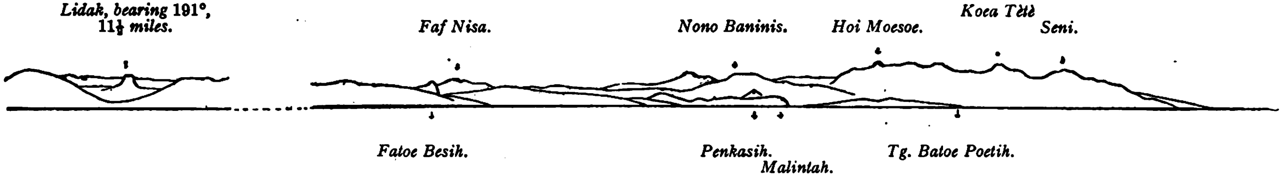
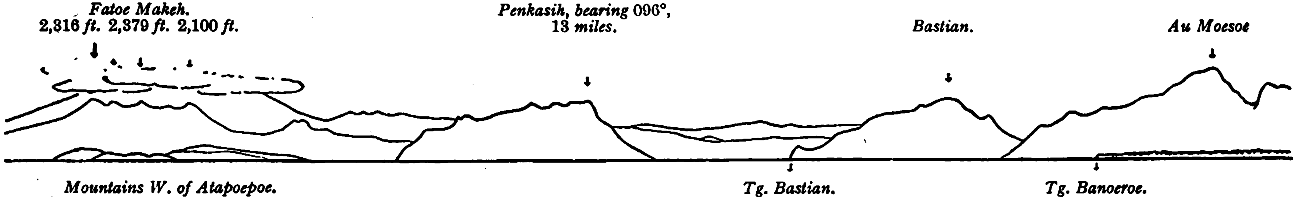
To face page 342.


2,828 ft.
Pai Tekaoe Ile.
2,488 ft.
2,484 ft.
a
a
1,975 ft.
1,427 ft.
1,175 ft.
266 ft.
1,332 ft.
a
a
E. point Timor, bearing 004°, 6 miles.
Jako.
Leti.

View, in two parts, of eastern end of Timor.
(*Original dated* 1933.)

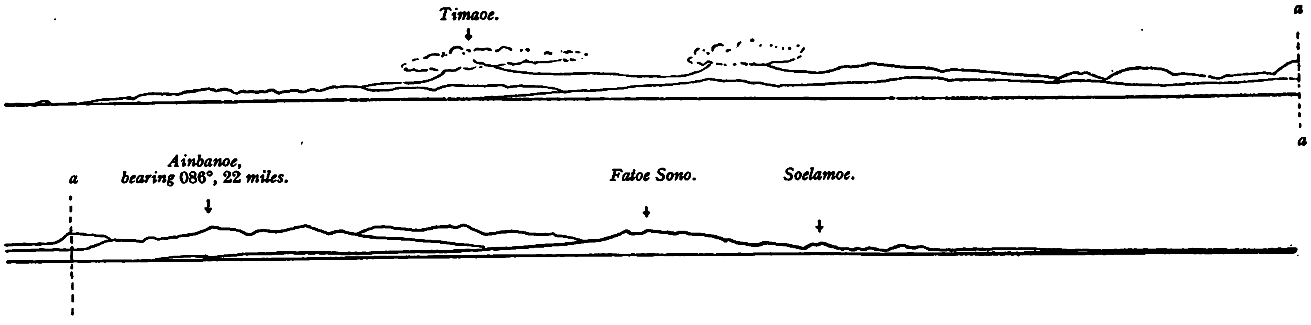

Lidak, bearing 191°, 11½ miles.
Faf Nisa.
Nono Baninis.
Hoi Moesoe.
Koea Tètè
Seni.
Fatoe Besih.
Penkasih.
Malintah.
Tg. Batoe Poetih.

Timor, north-west coast. Mountains westward of Atapoepoe.
(*Original dated* 1933.)

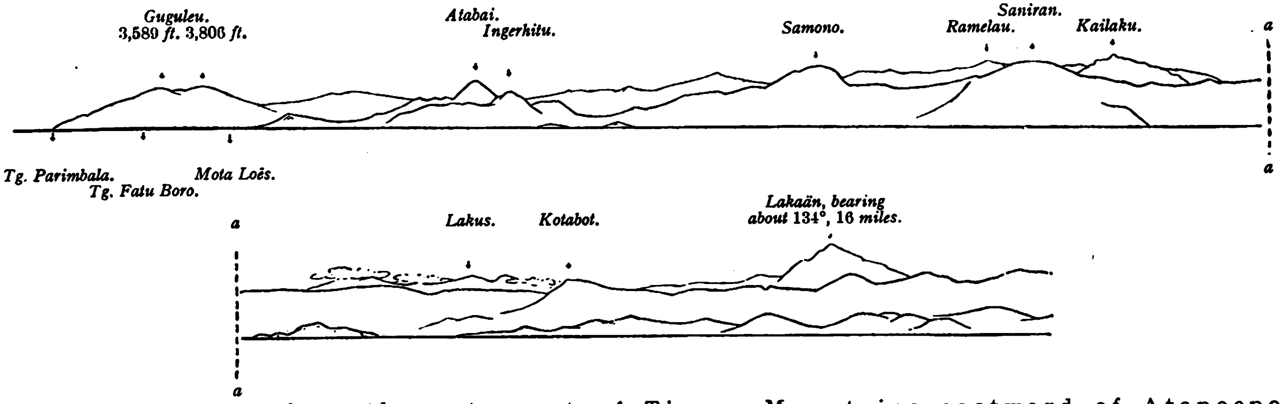

Fatoe Makeh.
2,316 ft. 2,379 ft. 2,100 ft.
Penkasih, bearing 096°, 13 miles.
Bastian.
Au Moesoe
Mountains W. of Atapoepoe.
Tg. Bastian.
Tg. Banoeroe.

Timor, north-west coast. Tanjong Bastian and vicinity.
(*Original dated* 1933.)

To face page 343.



View, in two parts, of west coast of Timor, northward of Koepang baai.
(*Original dated* 1933.)



View, in two parts, of north-west coast of Timor. Mountains eastward of Atapoepoe.
(*Original dated* 1933.)

Chart 3244.

Jaco.—Jaco lies close off the north-eastern extremity of Timor, and is a flat, uninhabited island, 263 feet ($80^{m}2$) high, with rocky coasts.

Straat Jaco, between Jaco and Timor, is a clear channel with a least width of about 3 cables, and can be safely navigated by holding a mid-channel course. The tidal stream may attain a rate of 4 knots at spring tides; the direction changes regularly, but the north-going stream is of longer duration than the south-going. There are whirlpools in both entrances, and there is a troubled sea off the southern entrance during the South-east monsoon.

Charts 3296, 1697.

WESTERN SIDE OF TIMOR.—The western part of Timor is mountainous, gradually decreasing in elevation towards the south-western extremity, so that southward of Koepang baai (page 344) the land is merely hilly; there are no distinctive summits. Irregular tidal streams and tide-rips are found off nearly all the salient points, which should, consequently, be given a wide berth. *See* view facing page 343.

Chart 3296, plan of Kupang bay and Roti strait.

Semaoe.—Light.—Semaoe (Semau), separated from the south-western extremity of Timor by Straat Semaoe (Semau), is a hilly island with no distinctive summits. Tanjong Oeloimi (Uloimi), the south-eastern extremity of the island, is steep-to. On the southern side of the island is a bay with irregular depths and greatly encumbered by a coastal reef; Pulau Merah, situated on the coastal reef on the western side of the bay, is a very prominent islet of a reddish-brown colour.

Teboei (Tebui) is a low island, fringed by a coral reef, lying about one mile off the south-western extremity of Semaoe; the passage between this island and Semaoe should not be attempted, as the depths are shoal and irregular, and the bottom is rocky. A bare hill of a reddish colour, 148 feet ($45^{m}1$) high, lies on the Semaoe coast opposite the northern extremity of Teboei. The southern part of the west coast of Semaoe, as far northward as Tanjong Oepeoh (Upeoh), about 3¾ miles northward of the 148-foot ($45^{m}1$) hill, is steep and rocky; thence a long sandy beach fringes the coast as far as the rocky Tanjong Bolang, the north-western extremity of the island, broken only by a rocky peak, named Karang besar, about midway between Tanjong Oepeoh and Tanjong Bolang.

The western coast of Semaoe should not be approached closely, the tidal streams are strong and tide-rips occur, especially over a bank, with depths of less than 5 fathoms ($9^{m}1$) over it, which extends about 1¼ miles north-westward from Tanjong Oepeoh.

Tanjong Koerong (Kurong), the northern extremity of Semaoe, is steep and is fringed by a narrow reef, plainly marked by discoloration.

A light (*Lat. 10° 08′ S., Long. 123° 27′ E.*) is exhibited, at an elevation of 410 feet ($125^{m}0$), from a white iron framework structure, 52 feet ($15^{m}8$) in height, situated nearly one mile south-south-westward of Tanjong Koerong.

Straat Semaoe.—Dangers.—Anchorages.—Straat Semaoe is deep and free from dangers, except just within the northern entrance, where a 2-fathom ($3^{m}7$) patch lies on the eastern side of the strait, in the bight between Tanjong Fanot, the eastern entrance point, and

Charts 1697, 942a, 2759a.

Chart 3296, plan of Kupang bay and Roti strait.

Tanjong Lelindo, 4 miles south-westward; the tidal streams sometimes set across the strait here.

A mooring buoy for small vessels is laid about 1½ miles south-westward of Tanjong Fanot.

The eastern side of the southern part of the strait, between Tanjong Oisina and Tanjong Lelindo, should be given a wide berth, as the depths outside the coastal reef are irregular, and a turbulent sea and tide-rips make steering difficult.

The south-going stream in the strait is of shorter duration than the north-going stream; the rate seldom exceeds 3 knots.

Telok Oe (U) Tefoana, a small bay on the Semaoe shore just within the southern entrance of the strait, is almost entirely occupied by a reef, and is only suitable for boats. On the Timor side of the strait, opposite Telok Oe Tefoana, a detached coral reef, with a least depth of 1¼ fathoms (2^{m}3) over it, lies off Batoebaoe (Batubau) village; small vessels with local knowledge can anchor between this reef and the shore, in depths of from 6 to 11 fathoms (11^{m}0 to 20^{m}1); the southern entrance to the passage is the easier. Anchorage may be obtained, in a depth of 18 fathoms (32^{m}9), about one mile westward of Toblolong village, situated about 2¾ miles north-north-eastward of Tanjong Oisina. Landing can be effected at all seasons on the beach at the village.

Pelikaan baai, in about the middle of the east coast of Semaoe, is entered southward of Kambang, an island, 318 feet (96^{m}9) high, off the entrance, but the passage, although deep, is very narrow. Nearly one mile westward of Kambang is a reef with two rocks above water, obstructing the entrance to the inner part of the bay, which is thus only available for small vessels with local knowledge. Anchorage may be obtained, in depths of from 6 to 11 fathoms (11^{m}0 to 20^{m}1), between the reef and Kambang.

Chart 3296, plan of Hainsisi anchorage.

Reede Hainsisi.—Hainsisi, situated on the Semaoe shore just inside the northern entrance to Straat Semaoe, is a coaling station for Government vessels only. A small vessel can anchor here, in a depth of 3¾ fathoms (6^{m}9), with a red water tank seen between two coaling sheds, bearing 004°; large vessels should not anchor in a depth of less than 18 fathoms (32^{m}9), as the depths decrease rapidly towards the shore. Landing can be effected here at all times at the landing steps of a stone pier; in 1941, there was a depth of about 7 feet (2^{m}1) at the steps and about 11 feet (3^{m}4) alongside the pier-head.

During the North-west monsoon, if the anchorage off Koepang is unfavourable, vessels of the Koninklijke Paketvaart Maatschappij anchor in Reede Hainsisi; passengers can then be landed at a stone pier at Tenaoe (Tenau), on the opposite side of the strait; there is a mast on the pier. Tenaoe is connected with Koepang by a motor road and by telephone.

Chart 3296.

Koepang baai.—Dangers.—Koepang (Kupang) baai, on the west coast of Timor, is entered between Tanjong Fanot and Tanjong Pakoelak (Pakulak), a sandy, wooded point, about 9 miles north-north-eastward. Kera (*Lat. 10° 05′ S., Long. 123° 33′ E.*), a low islet covered with coconut trees, lies in the middle of the entrance; the islet is fringed by a reef, which dries, plainly marked by discoloration,

Charts 1697, 942a, 2759a.

Chart 3296.

and there is usually surf on the northern side. Tikoes (Tikus), a rocky islet, 92 feet ($28^{m}0$) high, on the coastal reef extending 6 cables from the northern side of the entrance of Koepang baai, is very prominent. Boeroeng (Burung), a low islet about 2¾ miles north-eastward of Tikoes and 8 cables offshore, is difficult to identify.

Eastward of the line joining Tikoes and Tanjong Oësapa (Usapa), about 5½ miles southward, the depths decrease gradually towards the head of the bay, and the bottom consists of clay and mud; the head of the bay is very shoal, and there is a bank, which dries, extending as much as 6 cables offshore, with a marshy flat covered with mangroves behind. A 1¾-fathom ($3^{m}2$) patch lies about 6 cables northward of Tanjong Oësapa (*Lat. 10° 08′ S., Long. 123° 37′ E.*).

Chart 3296, plan of Kupang road.

Reede Koepang.—Lights.—Reede Koepang (Kupang) lies between Kera and lines joining that islet with Tanjong Fanot and Tanjong Oësapa, respectively.

Koepang, the principal village in the western part of Timor, is situated on the southern shore of Koepang baai and about 2¾ miles north-eastward of Tanjong Fanot; the village stands in a small plain at the mouth of Koi Nino or Koepang rivier, and is the headquarters of a Government official.

A light is exhibited, at an elevation of 78 feet ($23^{m}8$), from a white iron framework structure, 20 feet ($6^{m}1$) in height, situated on the western entrance point of Koi Nino rivier. A light is exhibited, at an elevation of 17 feet ($5^{m}2$), from a white pyramid, on the coast about half a mile north-eastward of the above light-structure. There is a white tomb about half a cable eastward of this pyramid.

There is a safe anchorage during the South-east monsoon, in a depth of about 10 fathoms ($18^{m}3$), with the south-western light-structure bearing 150°, and the white tomb in line with the white pyramid, bearing 083°. In the west monsoon it is better to anchor farther out, in a depth of 18 fathoms ($32^{m}9$); with a heavy sea vessels can anchor in the northern part of the bay, near Boeroeng, or off Hainsisi. There is a white mooring buoy about 3 cables northward of the south-western light-structure.

In the South-east monsoon landing can be effected at some stone steps by the Harbour master's office, situated on the eastern side of the entrance to the river; in the North-west monsoon, when conditions are favourable, boats can enter the river, but otherwise the landing place at Tenaoe should be used.

Provisions are scarce. Boiler water is supplied by a water tank, with a capacity of 7 tons, which must be towed off by the ship's boats; water can also be obtained from a hose at some steps at the eastern end of the sea wall, but the bottom steps only cover at high water. There is a hospital with a ward for infectious cases. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 1697.

Coast.—Beacon.—Anchorages.—The coast between Tanjong Pakoelak and Tanjong Siflana, about 6 miles northward, is steep and rocky; on the northern side of the latter point there is a small inlet, with a sandy beach, where boats can land. Tanjong Barate, about 3 miles north-eastward of Tanjong Siflana, may be identified by a

Charts 942a, 2759a.

Chart 1697.

large rock lying on the drying coastal reef close westward of the point.

Between Tanjong Barate (*Lat. 9° 54′ S., Long. 123° 36′ E.*) and Tanjong Koeroes (Kurus), nearly 8 miles north-north-eastward, there is a bight with sandy beaches in many places along the shore. Ajer (Ayer) Kosambe, a reef, which dries, marked by an unofficial beacon lies in the southern part of this bight and about 2½ miles east-north-eastward of Tanjong Barate. Anchorage can be obtained by vessels with local knowledge, in a depth of 7 fathoms ($12^{m}8$) mud, with the beacon on Ajer Kosambe bearing 080°. Tanjong Koeroes is a rocky point with a bare hill of a reddish colour, 217 feet ($66^{m}1$) high, on it.

Fatoe (Fatu) Benao is a prominent black, pillar-shaped rock lying close to the coast about 4 miles north-north-eastward of Tanjong Koeroes. Tanjong Mas, about 5½ miles northward of Fatoe Benao, has a steep hill on it, 302 feet ($92^{m}0$) high. Good anchorage may be obtained in favourable weather between Fatoe Benao and a point about 4 miles northward, about half a mile offshore, and also for a distance of about 2 miles southward of the rock. The coast between Tanjong Mas and Solioe (Soliu) village, about 7½ miles north-eastward, is very steep-to and anchorage is impracticable; Solioe village is not visible from seaward.

Tanjong Goemoek (Gumuk), about 4 miles north-north-eastward of Solioe and the north-western extremity of Timor, is formed by a spur from Kotto, a prominent hill situated about one mile south-south-eastward of this point and 1,201 feet ($366^{m}1$) high; Toenbessi (Tunbessi) lies about 3 miles south-eastward of Tanjong Goemoek. The coastal reef extends about half a mile from Tanjong Goemoek, the tidal streams are irregular, and there are frequently tide-rips; vessels should, therefore, give this point a berth of fully one mile.

NORTH-WESTERN SIDE OF TIMOR.—Coast.—The north-west coast of Timor, between Tanjong Goemoek and Ponta Parimbala, about 95 miles north-eastward, is mountainous over the greater part, but is occasionally broken by lower parts of hilly land. The principal mountains are: Fatoe Noe (Fatu Nu) Aaf, 3,954 feet ($1{,}205^{m}2$) high, about 22 miles north-eastward of Tanjong Goemoek, and prominent from all directions; Faf Nisa, 3,507 feet ($1{,}068^{m}9$) high, about 25 miles eastward of Fatoe Noe Aaf, is not very noticeable, but has a cleft in the summit when seen from north-eastward; near the coast north-westward of Faf Nisa are several high mountains, including Seni, 3,767 feet ($1{,}148^{m}2$) high, and Hoi Moesoe (Musu), 4,042 feet ($1{,}232^{m}0$); about 4 miles eastward of Hoi Moesoe is a summit 2,668 feet ($813^{m}2$) high, from which a ridge runs in a northerly direction towards the coast, and is visible to vessels bound for Reede Atapoepoe (page 348) from eastward; Bastian, a hill on the coast at the northern end of this ridge, is noticeable. Between Bastian and Tanjong Manikoe (Maniku), about 19 miles north-eastward, there is a hilly strip of land along the coast, but north-eastward of Tanjong Manikoe the land becomes mountainous again. Fatoe (Fatu) Makeh, about 7 miles southward of Tanjong Manikoe, is the northernmost peak of a rugged ridge running in a north and south direction; Fatoe Kadoea, about 4 miles east-south-eastward of the same point and 1,811 feet ($552^{m}0$) high, has a prominent cleft in its summit when seen from a north-north-westerly

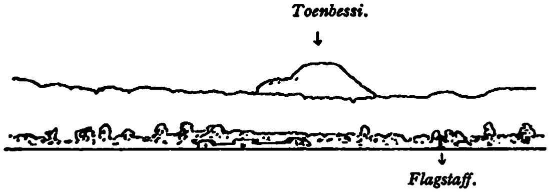
Charts 942a, 2759a.

Chart 1697.

direction; Lakaän, 12½ miles eastward of Fatoe Makeh, can be identified by its isolated position and conical shape. Atabai (chart 942a), about 9½ miles southward of Ponta Parimbala (*Lat. 8° 39′ S., Long. 125° 07′ E.*), has a prominent round-topped tree on its summit. *See* views facing pages 342, 343.

Chart 2468, plan of Naikliu road.

Reede Naiklioe.—Naiklioe (Naikliu) village lies about midway along the sandy shore of a bight between Tanjong Goemoek and Tanjong Naisoneh, a low point about 3½ miles east-north-eastward; the village can be identified by its flagstaff. Good anchorage can be obtained in Reede Naiklioe (Naikliu) northward of the middle of the village, in depths of from 15 to 16 fathoms ($27^{m}4$ to $29^{m}3$), sand and mud, but the depths shoal rapidly towards the shore.



Naiklioe village. Flagstaff bearing 190°.

(*Original dated* 1933.)

Chart 1697.

Coast.—Oilkabesa is a large black rock on the beach nearly 2 miles eastward of Tanjong Naisoneh. Tanjong Noilloi, about 4 miles north-eastward of Tanjong Naisoneh, is formed by a spur from the prominent hills Tekaka and Motabe, about 2¼ miles east-south-eastward.

Batu Anjo (Anyo), a rock which dries, lies about 5¾ miles north-eastward of Tanjong Noilloi and barely half a mile offshore.

Batek, a prominent islet of white limestone, 266 feet ($81^{m}1$) high, lies 5 miles northward of Tanjong Tobo, situated 7½ miles north-eastward of Tanjong Noilloi.

Good anchorage can be obtained by vessels with local knowledge off Soetrana (Sutrana) village, about 6 miles eastward of Tanjong Tobo, in a depth of 22 fathoms ($40^{m}2$), sand.

Pante Makassar is situated about 18½ miles north-eastward of Soetrana, and vessels with local knowledge can anchor about 2 cables off this village, in a depth of 22 fathoms ($40^{m}2$) sand. Tanjong Loesan Batoe (Lusan Batu) lies about 3¾ miles north-eastward of Pante Makassar.

Reede Wini. — Dangers. — Lights. — Beacons. — About 4 miles eastward of Tanjong Loesan Batoe, on the western shore of a small bay, is Wini village. Tanjong Banoeroe (Banuru) and Tanjong Tapena, the western and eastern entrance points of this bay, respectively, and about 1¼ miles apart, are low. A reef, which dries, extends about 2¾ cables northward from Tanjong Tapena, and a detached reef, with a depth of 3¾ fathoms ($6^{m}9$) over it, lies about half a mile farther northward.

Vessels should steer for the roadstead with the summit of Hoi Moesoe in line with a white pillar on the coast, bearing 193°, and anchor in a

Charts 942a, 2759a.

Chart 1697.

depth of 16 fathoms ($29^{m}3$), about 1½ cables offshore. A 2-fathom ($3^{m}7$) patch lies about 2¼ cables offshore north-eastward of the village and westward of the line of approach to the anchorage.

Two leading lights are occasionally exhibited, and by day two beacons form a cross mark.

Coast.—Anchorage.—Anchorage may be obtained by vessels with local knowledge off Malintah (*Lat. 9° 07′ S., Long. 124° 40′ E.*), about 12 miles east-north-eastward of Wini village; a tree, painted white, stands on the low coast between some cargo sheds; a detached reef, difficult to distinguish at high water, lies north-westward of the painted tree with its outer edge nearly 4 cables offshore. The anchorage should be approached from a position well seaward with the painted tree bearing 157°.

Tanjong Toewak (Tuwak) Meseh and Tanjong Batoe Poetih (Batu Putih) are the western and eastern extremities, respectively, of a bold headland about 15 miles north-eastward of Wini; this headland may be identified by several patches of white rock.

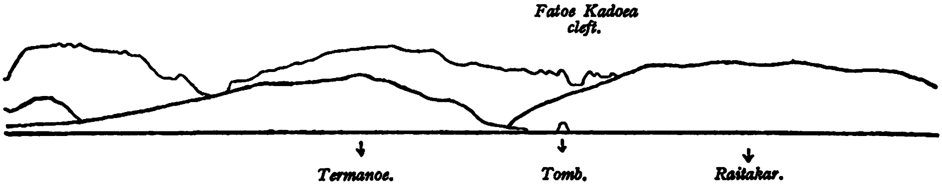
Chart 2468, plan of Atapupu road.

Reede Atapoepoe.—Dangers.—Beacons.—Atapoepoe (Atapupu) village stands on the shores of a narrow inlet about 9½ miles east-north-eastward of Tanjong Batoe Poetih. A white monument stands on the eastern side of the entrance to the inlet, and there is a prominent Customs shed close to it.

The roadstead is bounded by the arc of a circle described from the monument, with a radius of 6 cables.

Reefs, which nearly dry, extend about half a mile north-north-westward from the western side of the entrance to the inlet, and about 3 cables from the coast about half a mile northward of the eastern side of the entrance. The channel leading to the inlet is about three-quarters of a cable wide between these reefs, widening out to a basin with depths of from 3¼ to 8 fathoms ($5^{m}9$ to $14^{m}6$). There is, however, a reef, with a depth of 5 feet ($1^{m}5$) over it, marked by a beacon, surmounted by two white balls, about 5 cables north-north-westward of the monument. The edge of the reef on the western side of the entrance is marked by a white beacon surmounted by a ball, and that on the eastern side by a black beacon surmounted by a cone. An unofficial beacon stands on the reef about 2 cables northward of the monument.

Directions.—To enter the channel a vessel should keep the white monument in line with the highest point of the eastern side of the cleft in Fatoe Kadoea (page 346), bearing 164°, which leads close eastward of the beacon marking the reef with a depth of 5 feet ($1^{m}5$) over it.



Highest part of eastern side of cleft in line with tomb, bearing 164°.

(*Original dated* 1933.)

Charts 942a, 2759a.

Chart 2468, plan of Atapupu road.

Termanoe (Termanu) is a hill, 164 feet ($50^{m}0$) high, on the eastern side of the inlet, about 1½ cables northward of the monument, and on the western side is Tanjong Raitakar (*Lat. 9° 00′ S., Long. 124° 51′ E.*), 197 feet ($60^{m}0$) high.

The vessel should anchor westward of the leading line, in depths of from 4 to 7 fathoms ($7^{m}3$ to $12^{m}8$), mud, but, owing to the restricted space in the basin, it is advisable to moor. During the South-east monsoon vessels can anchor outside the coastal reef, on the leading line, in depths of from 30 to 40 fathoms ($54^{m}9$ to $73^{m}2$). The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. There are two small wooden jetties, suitable for small craft, at the village on the eastern side of the entrance to the narrow inlet. The village is connected to the general telephone system of the island.

Chart 1697.

Coast.—The coast between Atapoepoe and Batu Gadeh village, about 7 miles east-north-eastward, is a plain backed by mountains covered with mangroves, occasionally varied by sandy beaches. Vessels with local knowledge can anchor off the fort at Batu Gadeh village, in a depth of 11 fathoms ($20^{m}1$), sand and mud, about 1½ cables offshore, with the flagstaff bearing 142°, and Fatu Santu Antonio, a large rock close to the coast about one mile north-north-eastward of Batu Gadeh village, which shows up plainly against the green background, bearing 033°; the depths increase rapidly seaward of this position.

Mota Loës flows out about 6 miles south-south-westward of Ponta Parimbala, and is the only river in Timor that does not dry in the South-east monsoon. Vessels with local knowledge can anchor southward of the mouth of this river, in a depth of 22 fathoms ($40^{m}2$), sand, about 1½ cables offshore, with Ponta Fatu Beru (Boro), a rocky point about 3 miles northward of the mouth, in line with the low northern entrance point of the river, and an isolated hut on the beach, bearing about 114°.

Ponta Parimbala is one of several rocky points of a high, rounded part of the coast occupied by Guguleu (chart 3244) and other summits; Guguleu, 3,803 feet ($1{,}159^{m}1$) high, is frequently obscured by clouds, but if not, its bare summit, except for a few round-topped trees, can be identified from a great distance.

Chart 3244.

NORTHERN SIDE OF TIMOR.—General remarks.—The north coast of Timor is mountainous, especially the western part, between Ponta Parimbala and Ponta Subão, about 52 miles eastward, where the mountains rise steeply from the sea, except for a low plain about midway between these two points, in which Dilly is situated; the most prominent of these are Fatu Masin, 4,648 feet ($1{,}416^{m}7$) high, situated about 4½ miles inland and 15 miles eastward of Ponta Parimbala, and Kuri, about 4 miles west-south-westward of Ponta Subão. The summits of the higher ranges farther inland are generally obscured by clouds except during the South-east monsoon; the most noticeable of these are named, and their elevations are given on the chart. *See* views facing page 350. The north-eastern end of Timor is occupied by a fairly high, flat ridge of mountains, terminating in an almost

Charts 942a, 2759a.

Chart 3244.

perpendicular cliff about one mile within Ponta Sevivara, the north-eastern extremity of the island.

The numerous villages along this coast, many of which contain large mission houses and churches, and some of the houses built to resemble forts, give the whole a picturesque appearance and afford good landmarks when navigating within a few miles of the coast. The 100-fathom (182^{m}9) line lies close to the coast nearly everywhere, but fairly good anchorage can be obtained in places; Dilly (*see* below) is the most important place.

Coast.—Anchorages.—Maubara village, situated about 5 miles east-north-eastward of Ponta Parimbala (*Lat. 8° 39′ S., Long. 125° 07′ E.*), may be identified by its church, and by a house, surrounded by high walls, standing close to the sea; the residence of the Military Commandant, situated on the summit of a hill, is very prominent. Vessels with local knowledge can obtain temporary anchorage here, in a depth of about 27 fathoms (49^{m}4), with Tanjong Morai, about 1½ miles west-south-westward of the village, in line with a detached rock close westward of Maubara, and the roads on either side of the house near the beach open; strong tidal eddies may cause a vessel to swing and foul her anchor.

Vila de Liquica, about 7½ miles eastward of Maubara, can be identified by a monumental building, and is the headquarters of a Government official. Vessels with local knowledge can obtain good anchorage, in a depth of 27 fathoms (49^{m}4), sand, with the monumental building in line with the Custom house on the beach.

Tanjong Palila, about 2¾ miles east-north-eastward of Vila de Liquica, is a high, rocky point formed by a spur from Pisso, 1,755 feet (534^{m}9) high, situated about 1¼ miles southward of this point. Aipelo village, close eastward of Tanjong Palila, may be identified by its prison, a large building surrounded by a low wall. From Aipelo village to Tanjong Cai Tehu, about 1½ miles eastward, the coast consists of sandy beaches interspersed by patches of reef, but thence for 4 miles to Tanjong Tibar there is an unbroken coastal reef which extends as much as half a mile offshore in places. Tanjong Tibar is a high point; the Comoro river flows out near this point. For about one mile eastward of the river mouth there is a good white sandy beach, about one mile long, which is shelving and free from reef. It is reported that good anchorage may be obtained off the beach, but it is exposed during the North-west monsoon. Tibar village, situated on the slopes a short distance inland, is only visible from westward. Tanjong Mauduqui (Mau Doeki), about 3 miles east-north-eastward of Tanjong Tibar, is a low, muddy point.

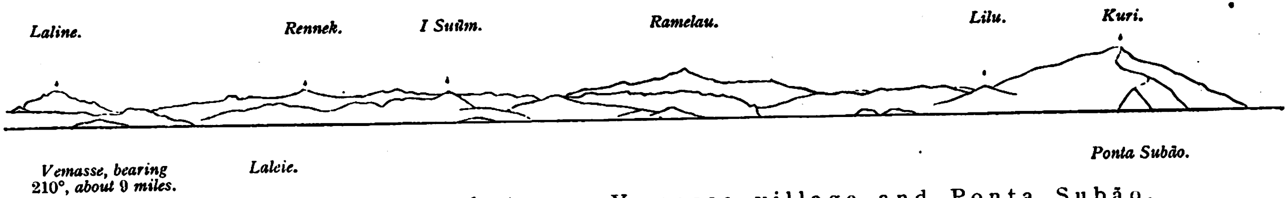
Chart 3440, plan of Dili road.

Dilly road.—Buoys.—Beacons.—Dilly (Dili) is situated in a low plain at the head of the bay between Tanjong Mauduqui and Ponta Fatu Cama (chart 3244), a high, salient point nearly 5 miles eastward; the Governor, and other Europeans, live in a settlement on the hills about 2½ miles inland.

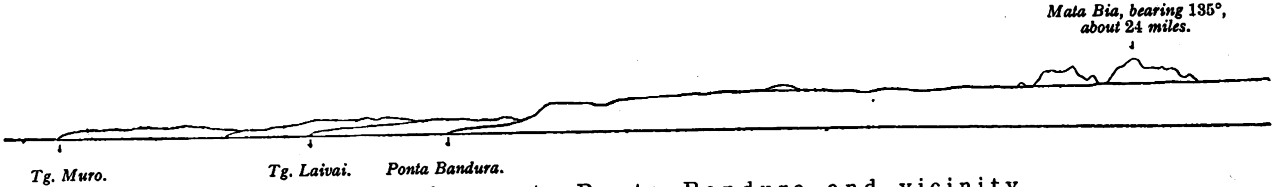
The inner roadstead is well sheltered by reefs, which dry, extending from the shore at each end of the town, and by a large detached reef between them; there is only a narrow passage on either side of the detached reef, and the western of these is generally used, as a small reef, with a depth of 9 feet (2^{m}7) over it, lies in the middle of the

Charts 942a, 2759a.

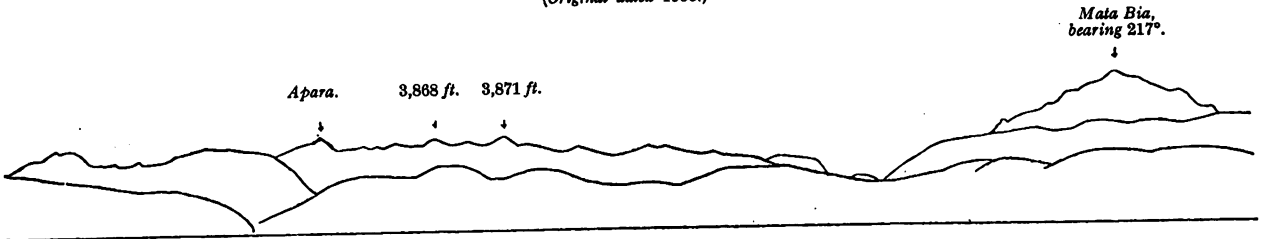
To face page 350.



Timor, north coast, between Vemasse village and Ponta Subão.
(Original dated 1933.)

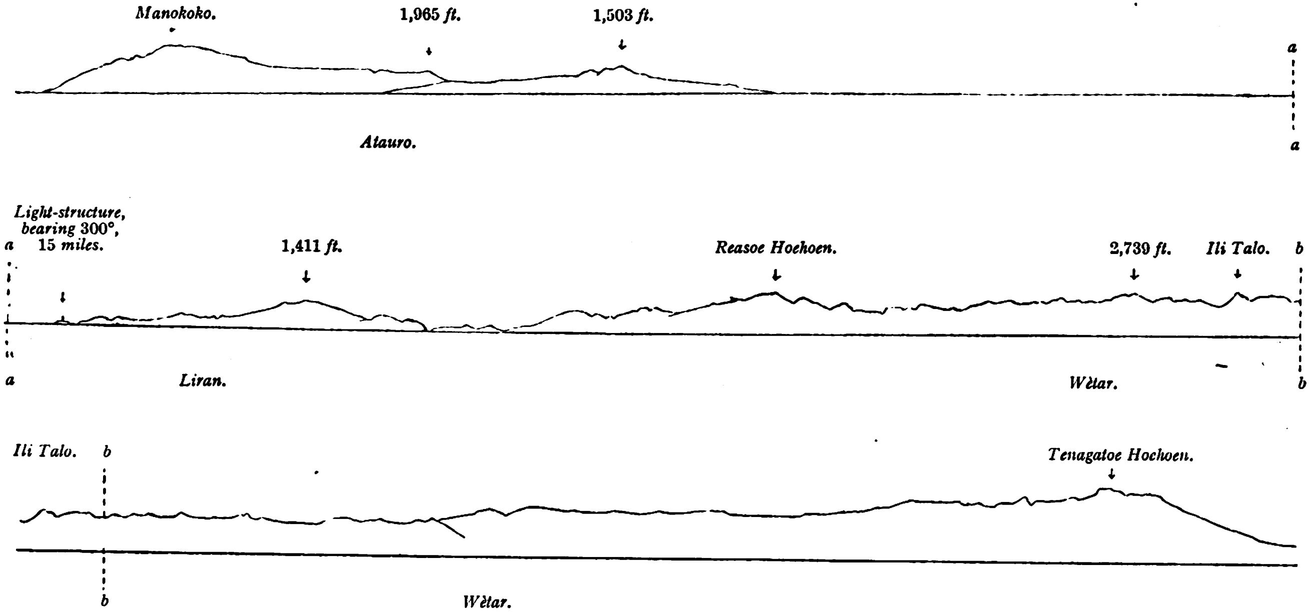


Timor, north coast. Ponta Bandura and vicinity.
(Original dated 1933.)



Timor, north coast. Apara and adjacent mountains.
(Original dated 1933.)

To face page 351.



View, in three parts, of northern side of Straat Wètar.

(*Original dated* 1933.)

Chart 3440, plan of Dili road.

eastern passage. Three reefs lie in the roadstead southward of the large detached reef.

The western entrance to the inner roadstead is marked by two conical buoys, each surmounted by a cross, from which lights are exhibited on request. The buoy on the southern side is black, and that on the northern side, red.

The western side of the eastern entrance is marked by a black can buoy moored on the eastern edge of the large detached reef; a beacon stands on the northern edge of this reef.

The westernmost of the three detached reefs in the inner roadstead is marked by a black can buoy moored on its western side. The southern detached reef is marked by a black can buoy and a beacon; two buoys mark, respectively, the southern end and the eastern side of the easternmost detached reef.

The buoys should not be depended on.

Anchorage.—Directions.—Large vessels, making only a very short stay, can anchor in the outer road, in a depth of 27 fathoms ($49^{m}4$), sand, south-eastward of a small, hard, 13-fathom ($23^{m}8$) patch lying about one mile northward of Ponta Laguebada (*Lat. 8° 33′ S., Long. 125° 34′ E.*), at the western end of the roadstead.

A vessel bound for the inner roadstead should steer for the light-structure, bearing 180°, until the ruins of the spire of the cathedral bear 139°, when she should alter course south-eastward and steer for the latter mark on that bearing, which leads through the western entrance between the two buoys; she should then steer to pass north-eastward of the buoy marking the westernmost reef in the roadstead, and anchor as desired, in depths of from 10 to 13 fathoms ($18^{m}3$ to $23^{m}8$). The eastern entrance should only be used by vessels with local knowledge.

Pilot.—A pilot is available.

Harbour facilities.—Provisions are procurable. Vessels requiring water can anchor close to the shore westward of the southernmost of the three detached reefs in the roadstead, with a stern hawser secured to a tree; water can then be taken in by a hose to a stand-pipe on the beach.

There is a landing pier, about 100 feet ($30^{m}5$) long, for light craft near the Custom house, but boats can land anywhere westward of the pier, where there is a sandy beach. There is also a small stone jetty.

There is a hospital on the slopes of the hills a short distance inland.

The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3244.

Coast.—Lights.—Dangers.—The coast between Ponta Fatu Cama and Ponta Fatu Lana, 15 miles eastward, is mostly low and covered with mangroves, except for a steep point, with a rock named Fatu Malaho lying close off it on the coastal reef, about 6½ miles eastward of Ponta Fatu Cama. Hera and Met Naro villages stand about 5 and 9 miles eastward of Ponta Fatu Cama, respectively, but are not readily identified from seaward; a 5½-fathom ($10^{m}1$) patch lies about 1¼ miles offshore northward of Hera. Mata Musin (Moesin), a rock above water, lies close to the coast about half a mile westward of Ponta Fatu Lana.

Between Ponta Fatu Lana and Ponta Subão, the coast rises steeply

Charts 942a, 2759a.

Chart 3244.

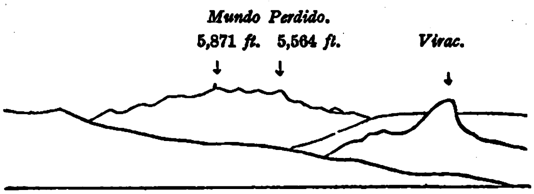
to Kuri, 4,521 feet (1,378$^{\text{m}}$0) high ; Ponta Subão is a steep, black cliff, and is very prominent from eastward.

Vila de Manatuto, about 3 miles south-eastward of Ponta Subão, is a fairly important place and is the residence of a Government official ; it can be easily identified by a white church with two towers, and some houses on a hill. Vila de Manatuto is the place of export for the surrounding district.

Two leading lights are occasionally exhibited at Vila de Manatuto.

There is anchorage for vessels with local knowledge, in a depth of about 30 fathoms (54$^{\text{m}}$9), but the bottom is soft mud and not good holding ground. Landing can be effected on the beach, which is steep-to, but there is a heavy swell at times.

The coast between Vila de Manatuto and Ponta Bigono (*Lat.* 8° 26′ *S., Long.* 126° 22′ *E.*), about 21 miles east-north-eastward, is hilly, and thence to Ponta Bandura, about 3½ miles farther eastward, it is high and steep. Virac, about 2¾ miles inland and 8¼ miles south-westward of Ponta Bigono, is 1,998 feet (609$^{\text{m}}$0) high and prominent ; other good landmarks are Vemasse village, situated on a hill about one mile inland and 482 feet (146$^{\text{m}}$9) high, about 3½ miles west-north-westward of Virac, and Laleia village, situated high up on the hills about 6 miles westward of Virac. Lamsana village is situated at the head of an inlet about 3½ miles eastward of Vila de Manatuto. *See* views facing page 350. Small craft may obtain sheltered anchorage, in depths of from 2½ to 3 fathoms (4$^{\text{m}}$6 to 5$^{\text{m}}$5) in the inlet ; large vessels can anchor outside.


Mundo Perdido.
5,871 *ft.*
5,564 *ft.*
Virac.

Virac bearing 186°, distant about 9 miles.

(*Original dated* 1933.)

Vila Salazar is situated about 3½ miles south-eastward of Ponta Bandura and about 1½ miles inland, at an elevation of 1,047 feet (319$^{\text{m}}$1) ; it is the headquarters of a Government official. Vessels with local knowledge can anchor off the road leading to the village, in a depth of 22 fathoms (40$^{\text{m}}$2), coral ; vessels will then swing well clear of the narrow coastal reef, and lie well in both monsoons. A noticeable group of rocks, named Fatu Sika, lies close offshore about 1¾ miles westward of the anchorage. A brisk trade is carried on by praus.

Laga village is situated on the slopes of the hills about 8½ miles eastward of Vila Salazar, and can be identified by its prominent white fort. Vessels with local knowledge can anchor close to the coast, in a depth of 16 fathoms (29$^{\text{m}}$3), mud, with the fort bearing 158°.

For about 2½ miles eastward of Laga there is a sandy strip of coast with a sandy beach interspersed with reef, thence for about 3 miles the coast is fringed by reef, thence there are again sandy beaches interspersed with reef as far as Ponta Lavai, a low point about 9 miles east-north-eastward of Laga.

Charts 942a, 2759a.

Chart 3244.

Nova Ancora village is situated on the slopes of the hills close south-eastward of this point. There is anchorage for vessels with local knowledge, sheltered in the North-west monsoon, in a depth of 16 fathoms (29^{m}3), coral, with Ponta Lavai bearing 297°, and the flagstaff of the fort, 227°.

About 10 miles eastward of Ponta Lavai is Vila Nova Malaca, where there is a prominent fort on a rocky point; close eastward of this point there are four stone pillars on the beach. Vessels with local knowledge can obtain good anchorage, in a depth of about 11 fathoms (20^{m}1), mud, with the pillars bearing 150°, and Tanjong Sika, situated about one mile westward of the fort, bearing 242°; vessels lie well here in the South-east monsoon, but the depths decrease rapidly towards the coast. Tanjong Sika may be identified by a solitary sago palm standing close to its extremity.

Ponta Curo, about 4 miles north-eastward of Vila Nova Malaca, and Ponta Chater, about 2½ miles farther eastward, are comparatively low points, but the land rises steeply behind. Nova Nazare is situated about 4½ miles south-eastward of Ponta Chater (*Lat. 8° 19′ S., Long. 127° 00′ E.*), and vessels with local knowledge can obtain fairly good anchorage, even in the west monsoon, in a depth of 25 fathoms (45^{m}7), stony bottom, with the middle of a rocky point close eastward of the village bearing 230°, and Ponta Apile, about 1¼ miles north-westward of the village, bearing 310°; the depths decrease very rapidly towards the shore. This anchorage is in a small natural harbour formed by an opening in the coastal reef; it is available to vessels of up to 2,000 tons and is used as a refuge in bad weather; the entrance is about one cable wide and is easy of approach.

Nova Nazare stands at the eastern end of the motor road along the northern coast of Timor.

Loiquero, which resembles a fort, stands on the slope of the hills about three-quarters of a mile inland, about 6 miles eastward of Nova Nazare, and is very prominent. Ponta Hero, 8 miles eastward of Ponta Apile, is very similar to Ponta Sevivara (page 350). The coast between Ponta Hero and Ponta Sevivare consists of cliffs and is steep-to.

Charts 3244, 1697.

STRAAT OMBAI.—Tidal streams.—Straat Ombai is the wide, deep passage separating the north-west coast of Timor from the Alor eilanden; from October to March it is frequently used by sailing vessels proceeding from Europe to China and Japan, and is also used by sailing vessels bound for East Java from the China sea from the middle of May to the end of June.

The tidal streams are noticeable in Straat Ombai; during the South-east monsoon, however, there is generally a stream setting in a west to south-west direction, and in the west monsoon in an east to north-east direction. The maximum observed rate was 3 knots, and occurred in June, with the stream setting in a south-westerly direction.

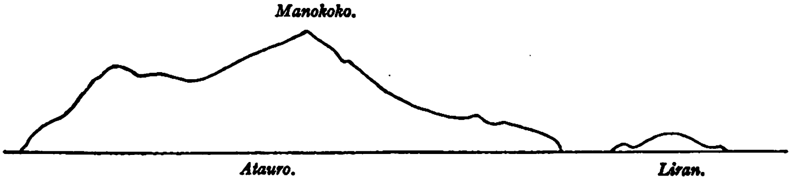
Chart 3244.

ATAURO.—Atauro or Kambing, 21 miles eastward of Alor, is an island rising steeply from the sea on all sides; the highest mountain, named Manokoko (*Lat. 8° 16′ S., Long. 125° 34′ E.*), has an

Charts 942a, 2759a.

Chart 3244.

elevation of 3,373 feet (1,028^{m}1), and lies in the southern part of the island. The high coast can be closely approached, and appears barren and almost inaccessible. The inhabitants are still very uncivilised, and exist chiefly by fishing and the cultivation of maize; lime and a small quantity of copra are exported.



Manokoko, bearing 341°, distant 11 miles.

(*Original dated* 1933.)

There is an occasional narrow sandy beach along the steep, rocky west coast, also a few huts, but there is no anchorage. The south coast is also steep and rocky; landing can be effected near Mascadade village, situated at the head of a bight in this coast about 1½ miles westward of Ngo toetoen (*Lat. 8° 19′ S., Long. 125° 35′ E.*), the south-eastern extremity, but there is no suitable anchorage.

The east coast consists alternately of sandy beaches and rocky points. Mau Metan village, lying about 3 miles north-north-eastward of Ngo toetoen, is the headquarters of the Government official; vessels with local knowledge can anchor off this village, in a depth of 20 fathoms (36^{m}6), sand and stones, with the house of the Government official bearing 283°, and Tanjong Bikeli, a rocky point covered with trees about half a mile northward of the village, bearing 353°. There are several other villages along this coast, but Toro, about 6 miles southward of Tanjong Hatoe Naroe, the northern extremity of the island, containing fairly large houses standing close to the sea, is the only one that is noticeable.

STRAAT WÈTAR.—Straat Wètar, the wide passage between the north coast of Timor and the south coast of Wètar, is used regularly by local shipping and also by vessels proceeding between Java and Australia, and between Singapore and Australia; vessels on the two latter routes pass northward of Kleine Soenda eilanden, also Solor and Alor eilanden, by following the parallel of 8° S. Vessels on these two routes usually enter the strait from north-westward by the passage, generally known as Wètar passage, between Atauro and Liran, about 7 miles north-eastward, and pass out eastward between the north-eastern extremity of Timor and Kisar, an island about 14 miles northward (*see* Eastern Archipelago Pilot, Vol. III).

There are no known dangers in Straat Wètar outside the 100-fathom (182^{m}9) line surrounding the adjacent islands. Attention is, however, called to the Sumatra reef, charted about 20 miles eastward of Atauro, which was discovered by the Dutch man-of-war *Sumatra* in 1853; its position, and the depth over it, are doubtful, but the vessel sighted strong discoloration, and picked up a sounding of 14 fathoms (25^{m}6).

The currents in Straat Wètar are not well known, but are probably similar to those of Straat Ombai (*see* page 353); they seldom exceed about half a knot. There are, however, strong tidal streams in the

Charts 942a, 2759a.

Chart 3244.

narrow passage between Liran and Wètar, and also off Eden toetoen (*Lat. 7° 59′ S., Long. 126° 28′ E.*), about 40 miles eastward of Pibia toetoen, the south-western extremity of Wètar, where there are strong tide-rips. *See* view facing page 351.

Liran.—Anchorage.—Dangers.—Liran, situated westward of Pibia toetoen, is a mountainous island, rising to an elevation of 1,409 feet (429^{m}4) near the middle. The coastal reef extends nearly 3 cables from the western side, and considerably farther from the east coast; the prominent islet Babi lies near the edge of the coastal reef extending from the north-eastern extremity of the island. A long, narrow shoal, with a least depth of 5 fathoms (9^{m}1) over it, runs parallel with the west coast of Liran at a distance of about three-quarters of a mile; the southern extremity of this shoal lies about one mile north-north-westward of the southern extremity of Liran, and from this position it extends northward for about 3 miles.

Nautilus rif lies about 1¼ miles northward of Liran and nearly dries; two noticeable coral patches, always above water, lie on the northern and south-western extremities, respectively, of this reef. There is a clear passage between Nautilus rif and Liran, but the northern extremity of the latter should be given a berth of fully half a mile.

Straat Liran between the coastal reef extending from Liran and the south-western extremity of Wètar, is quite clear, but the tidal streams sometimes attain a rate of 3 knots, the reef extending from Liran is steep-to, and is plainly marked by discoloration under favourable conditions of weather.

In the east monsoon there is anchorage for vessels with local knowledge, in a depth of about 33 fathoms (60^{m}4), sand, nearly 2 cables from the coastal reef, with the light-structure on the southern extremity of Liran bearing 095°, and the north-western extremity of the island bearing 000°.

Chart 2468, plan of South anchorage.

Anchorage.—Light.—In the west monsoon there is anchorage for vessels with local knowledge, in a depth of about 19 fathoms (34^{m}7), sand and coral, with the light-structure on Liran bearing 315°, and the eastern extremity of the island bearing 022°; caution should be exercised here, however, as the depths are very irregular and detached dangers lie 4 cables offshore.

A light is exhibited, at an elevation of 216 feet (65^{m}8), from a white iron framework structure, 66 feet (20^{m}1) in height, situated close within the southern extremity of Liran.

Chart 3244.

WÈTAR.—Wètar is a rugged, mountainous island, with high, steep, inhospitable coasts; there are practically no anchorages, and Ilwaki village (page 356), on the south coast, is the only place of any importance. The island is sparsely populated, and the inhabitants dwell chiefly in villages along the coasts, but the climate there is unhealthy.

Approaching from the westward, Réong (*Lat. 7° 40′ S., Long. 125° 55′ E.*), an island off the north-western extremity of Wètar, and Liran, are useful landmarks. From south-eastward, and when passing through Straat Wètar, two prominent mountains, 4,086 feet (1,245^{m}4) and 3,915 feet (1,193^{m}3) high, situated about 15 miles north-

Charts 942a, 2759a.

Chart 3244.

north-eastward and 17 miles north-eastward, respectively, of Eden toetoen, are particularly good landmarks; the eastern and lower of the two has a flat summit, and the western is dome-shaped. In the western part of the island is Tenagatoe Hoehoen, with a flat summit, 4,578 feet (1,395^{m}4) high, situated about 20 miles, north-eastward of Pibia toetoen, and Ilmetang, 2,183 feet (665^{m}4) high, with numerous white patches, situated near the coast about 16 miles north-eastward of Pibia toetoen.

Southern side of Wètar.—Pibia toetoen rises to an elevation of 946 feet (288^{m}3), and thence a ridge of mountains extends north-eastward. Between this point and Goeng toetoen, 8½ miles north-eastward, the coast consists of sand and shingle, alternated by rocky points; Hatoemasin toetoen, about midway between these two points, is a very prominent high point. Kara village is situated by the mouth of a stream about one mile northward of Hatoemasin toetoen. Lemar village stands on Lakoetepa toetoen, a low point covered with trees about 6½ miles north-eastward of Goeng toetoen. Daielin toetoen, about 9 miles eastward of Lakoetepa toetoen, is low and sandy, whilst Lan toetoen, about half a mile farther eastward, is steep and rocky. Hatpaäs toetoen is a low point about 3½ miles eastward of Daielin toetoen, and thence the coast eastward to Eden toetoen, a steep, rocky point, consists of shingle, backed by low mountains.

Chart 2468, plan of Ilwaki road.

Reede Ilwaki.—Reede Ilwaki is situated off Ilwaki village at the head of Saoe baai, about 4 miles north-westward of Eden toetoen; the village stands a short distance inland, but a shed and a couple of houses on the beach can be seen from a considerable distance. The bay affords sheltered anchorage in the west monsoon, and also with south-easterly winds, in a depth of about 30 fathoms (54^{m}9), with Ilpoi toetoen (Ilikoi), a rocky point, 269 feet (82^{m}0) high, on the eastern side of the bay, bearing 120°; this is the only good anchorage in the whole of Wètar. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3244.

Western side of Wètar.—The west coast of Wètar is steep in places, and in others rises gradually to the mountains within. Ili Talo, a dome-shaped mountain 2,839 feet (865^{m}3) high, lies about 7½ miles north-eastward of Pibia toetoen, and forms part of a crater-shaped mountain crest.

Diroeroe toetoen (*Lat. 7° 52′ S., Long. 125° 48′ E.*), about 9 miles northward of Pibia toetoen, is a low point covered with mangroves; several shoal patches lie up to a distance of one mile off the coast between these two points, and the 100-fathom (182^{m}9) line lies as much as 1½ miles offshore. Immediately southward of Diroeroe toetoen are some sandbanks above water.

Labuan Air Panas, about one mile north-eastward of Diroeroe toetoen, affords sheltered anchorage during the east monsoon for vessels with local knowledge, in depths of from 16 to 22 fathoms (29^{m}3 to 40^{m}2), about 2 cables offshore, with a prominent white tree bearing 158°.

Noenoekae toetoen is a rocky point about 4½ miles north-north-eastward of Labuan Air Panas; a prominent hill, 827 feet (252^{m}1) high, lies close to the coast about one mile north-eastward of this point.

Charts 942a, 2759a.

Chart 3244.

Réong, an island 870 feet (265^{m}2) high, is separated from the north-western extremity of Wètar by a narrow, clear, and deep channel, but the tidal streams are sometimes strong.

Northern side of Wètar.—The north coast of Wètar is steep and rocky almost throughout; there are numerous small bays, but few of them afford anchorage. The only prominent mountain is Ilwai, 2,396 feet (730^{m}3) high, situated one mile inland and nearly 12 miles east-south-eastward of Lihoewai toetoen, the north-western extremity of Wètar.

Lihoetaoe rivier flows through a small plain about 21 miles eastward of Lihoewai toetoen, and the sombre, forbidding coast has a more hospitable appearance here. Vessels with local knowledge can anchor off the mouth of the river, in depths of from 22 to 27 fathoms (40^{m}2 to 49^{m}4), about one cable offshore, with a hawser to the shore; Tara village lies a short distance up the river, which is, however, inaccessible owing to its shoal bar. Tihoe lake, where the river has its origin, lies about 3 miles inland.

Sakir rivier flows out about 5½ miles north-eastward of Lihoetaoe rivier, and is accessible for boats, but it rapidly becomes narrow and shallow; the banks higher up are inhabited.

Labuan Makka, about 6 miles north-eastward of the mouth of Sakir rivier, is the best anchorage on the north coast of Wètar, and is the roadstead for Oehak village, situated a short distance south-westward; the place is easily identified, as a very prominent rock lies close under the coast on either side of the bay. A small river flows into the bay, and vessels with local knowledge can anchor off the mouth, in a depth of about 22 fathoms (40^{m}2), sand, with the western rock bearing 254°, and the mouth of the river, 128°; the river affords good drinking water even in the dry season. Bananas and vegetables can be obtained at Oehak village.

Nila toetoen, about 6 miles eastward of Labuan Makka, and Toedjaoe toetoen, about one mile farther eastward, are the extremities of a bold headland, 1,400 feet (426^{m}7) high, which can be identified from a considerable distance from eastward or westward. During the east monsoon there is a heavy sea and bad weather near the coast eastward of this headland, whilst westward of it there is a calm sea and practically no wind.

There are several villages along the coast between Toedjaoe toetoen and Hatoeloi toetoen, about 12 miles east-south-eastward, but in both monsoons there is a heavy surf along this part of the coast, except in the bight immediately southward of Toedjaoe toetoen.

Eastern and south-eastern sides of Wètar.—The east coast of Wètar between (Hatoeloi toetoen and Iskanawatoe toetoen, a rocky point, 100 feet (30^{m}5) high, about 6 miles southward, the coast is steep-to; there are, however, strong tidal streams and whirlpools.

The south-east coast of Wètar, between Iskanawatoe toetoen and Eden toetoen (page 355), forms a wide bight. Toepoeti village is situated about 10 miles north-north-eastward of Eden toetoen, and a small vessel with local knowledge can anchor off the village, laying out a hawser to the shore. A small river flows out here, but the bar off the mouth nearly dries.

Chart 942a.

Outlying island.—Goenoeng (Gunung) Api (*Lat.* 6° 39′ *S.*,

Charts 942a, 2759a.

Chart 942a.

Long. 126° 40′ E.), about 55 miles northward of Nila toetoen, is an uninhabited volcanic island, 925 feet ($281^{m}9$) high, in the shape of a truncated cone, with almost bare slopes occasionally showing volcanic action; the western edge of the crater is considerably lower than the other part of the edge. A coastal reef extends in places, but is never wider than one cable. With light south-easterly winds a small vessel with local knowledge can anchor on a bank extending from the northern side of the island, about 1½ cables offshore.

Charts 942a, 2759a.

CHAPTER XII

SOUTH AND SOUTH-EAST COASTS OF BORNEO, FROM TANJONG BATOE DJOEROENG TO STRAAT LAOET

Charts 941a, 941b.

SOUTHERN SIDE OF BORNEO.—The whole of the south coast of Borneo is of the same monotonous character, with no distinctive landmarks, being densely wooded, although at the mouths of the rivers the trees are generally taller. Most of the rivers can only be entered at high water by vessels of any draught; in the lower reaches the banks are low and densely wooded, with occasional clearings, under cultivation or containing villages. There are cuttings, known as " antassans," in the lower and middle reaches of the rivers, thereby shortening the distance when the rivers are tortuous. Between the mouths of the rivers the coast is practically uninhabited.

The greatest caution must be exercised when approaching this coast, as reefs extend many miles off in some parts, and are always difficult to see, especially in the North-west monsoon, when the discharge from the rivers is very great.

Climate and weather.—*See* page 17.

Currents and tidal streams.—The horizontal movement of the water along the south coast of Borneo is a mixture of tidal streams and monsoon current. The only particulars known about the tidal streams are that at about high water the stream sets westward, and at about low water it sets eastward; in the North-west monsoon a predominating east-going stream may be expected, and in the South-east monsoon a west-going stream. The monsoon current seldom appears to exceed a rate of one knot.

In the various bays, into which large rivers flow out, the general direction of the stream is naturally altered, and the rate of the stream setting in or out averages from one to 1½ knots. In the channels between the banks, and close along the points, as well as in the mouths of the rivers, the stream may attain a rate of 3 knots.

Chart 3757.

Coast.—Tanjong Batoe Djoeroeng (Batu Jurung), 24 miles north-north-westward of Tanjong Sambar (*Lat. 3° 00′ S., Long. 110° 19′ E.*), the south-western extremity of Borneo, is high and rocky, and a narrow ridge of hills, culminating in a conical peak, 625 feet ($190^{m}5$) high, extends north-eastward to the southern bank of Sungei Kendawangan.

Two islets, the southern and larger named Iras, and the northern Tating, lie close off Tanjong Batoe Djoeroeng. Tjempedak (Chempedak),

Charts 2160, 1263.

Chart 3757.

a low, thickly wooded islet almost entirely surrounded by reefs and rocks, lies nearly 1½ miles westward of this point; it has a rocky coast, except on the south-eastern side, where there is a sandy beach and a small settlement. The islet should not be approached within a distance of 6 cables on the seaward sides. There is a channel between Tjempedak and Iras, with depths of over 5 fathoms ($9^{m}1$) in the fairway; also between Tjempedak and Bawal, with depths of 6 fathoms ($11^{m}0$), but two reefs, with depths of 2 and 2½ fathoms ($3^{m}7$ and $4^{m}6$) over them, respectively, lie in the eastern part of the fairway.

Bawal.—Dangers.—Anchorages.—Bawal, a densely wooded low island, except for two hills, 290 and 221 feet ($88^{m}4$ and $67^{m}4$) high, respectively, lies 2½ miles south-south-westward of Tjempedak. Tanjong Rotan, its south-western extremity, is a prominent headland. Reefs extend as much as one mile from the northern and western sides, and several rocks and islets lie off the northern extremity; amongst the islets are Langir and Tanah Merah, the latter being of a rounded shape and of a reddish colour. Foul ground extends for about 5 miles southward of Bawal, with the islets Perantoeng (Perantung) and Magnin near its southern extremity; Perantoeng is low and flat, and Magnin is a prominent rock covered with vegetation. Corcyra bank, with a depth of 2 fathoms ($3^{m}7$) over it, lies 4 miles westward of Perantoeng, and there is another 2-fathom ($3^{m}7$) patch about 1¼ miles north-eastward of this bank; a 2½-fathom ($4^{m}6$) patch lies about 2 miles southward of Corcyra bank; all this area is dangerous owing to rocks and sandy shoals.

Sheltered anchorage may be obtained in both monsoons eastward of Bawal, in depths of from 7 to 11 fathoms ($12^{m}8$ to $20^{m}1$), mostly mud; this anchorage can only be reached by passing through the channel between Bawal and Tjempedak, which should be entered from westward by a vessel steering about 112° for a position a little northward of Tanah Merah, and altering course to about 090° when within 3½ cables of that islet, so as to pass southward of the 2-fathom ($3^{m}7$) reef at the eastern end of the channel; course can then be altered southward, passing eastward of some rocks above water lying nearly half a mile eastward of Tanah Merah (*Lat. 2° 40′ S., Long. 110° 07′ E.*). The channel eastward of Bawal is about one mile wide, but a rock, with a depth of 4 feet ($1^{m}2$) over it, lies about 1¾ miles east-north-eastward of the south-eastern extremity of Bawal. A 1¼-fathom ($2^{m}3$) patch and a rock awash lie about 2 miles north-north-eastward and 2¼ miles east-north-eastward, respectively, of the same point, and there are two shoals, with depths of 2 and 2¾ fathoms ($3^{m}7$ and $5^{m}0$) over them, lying about 3 miles east-north-eastward and the same distance north-eastward, respectively, of the point.

Charts 3757, 1964.

Gelam and adjacent islets.—Gelam, about 7 miles south-south-eastward of Bawal, and 1½ miles westward of Tanjong Kepala, situated 16½ miles south-south-eastward of Tanjong Batoe Djoeroeng, is a very low, densely wooded island, difficult to identify from westward, when it appears as a long, slightly darker strip against the coast behind. Foul and rocky ground extends for a considerable distance northward and southward of the island, and patches, with depths of less than 6 fathoms ($11^{m}0$) over them, for nearly 9 miles westward. Langau, 3 miles westward of Gelam, is a moderately high, rocky, islet with a rugged

Charts 3757, 1964.

appearance; Gambar, about 8 cables southward of Langau, consists of two rocks lying close together and covered with vegetation. A strong tidal stream runs between these islands, and the whole area, to within 6 miles south-westward of Gelam, is encumbered with sandbanks and sunken rocks.

Tanjong Sambar and off-lying islets and dangers.—Beacon.—Tanjong Sambar is a rocky point with some trees on it; on the western side of the point is a prominent, fork-shaped tree, higher than the others, and visible 13 miles. Numerous rocks above water lie off the point, and a rock, which dries, lies about 1¼ miles southward of it.

Penamboen (Penambun), about 5½ miles west-south-westward of Tanjong Sambar, has three isolated trees on it, which have the appearance of three rocks from a distance of 12 miles. Mangkoet (Mangkut), about 2 miles south-south-westward of Penamboen, has one tree in the middle, visible from a distance of 14 miles.

A beacon, surmounted by a ball, stands on a reef which dries, about 3½ miles south-eastward of Mangkoet.

The area for about 40 miles southward of Tanjong Sambar, embracing Fox and Clemencia banks, is encumbered with ridges of sand, marked by overfalls, and is not navigable. Vessels approaching from northward should allow for the strong easterly set across these banks, augmented by the North-west monsoon drift in that season.

Outlying dangers.—Buoy.—Clemencia bank, about 25 miles south-south-westward of Tanjong Sambar (*Lat. 3° 00′ S., Long. 110° 19′ E.*), is a ridge of hard sand with a least depth of about one foot ($0^{m}3$) over it; it is steep-to and nearly always marked by surf.

A red conical buoy, surmounted by a cylinder, is moored about 7½ miles north-westward of the shoalest part of Clemencia bank.

Aruba banks, more than 2 miles south-eastward of Clemencia bank, consist of two narrow banks with a least depth of 2 fathoms ($3^{m}7$) over them; they are generally marked by ripplings.

Fox banks extend in a south-easterly direction for about 10 miles from Aruba banks; Fox shoal, the shoalest part of them, lies at the north-western end and 32 miles south-south-westward of Tanjong Sambar, and has a least depth of 2 fathoms ($3^{m}7$) over it. There are always strong ripplings over these banks, and with a moderate gale there is a turbulent sea, but the banks never break.

Chart 1964.

Linge shoal, of hard sand, with a depth of one fathom ($1^{m}8$) over it, lies about 15 miles southward of Tanjong Sambar.

Charts 3757, 1964.

There are irregular depths for a considerable distance outside all these banks; a shoal, with a depth of 7 fathoms ($12^{m}8$) over it, lies about 14 miles south-westward of Clemencia bank, and there is also a 7-fathom ($12^{m}8$) patch about 9½ miles south-westward of Fox shoal.

Caution.—Fishermen with acetylene lamps frequent the southern approach to Straat Karimata (Carimata).

Chart 1964.

Coast.—Dangers.—Ayer Hitam baai, entered between Tanjong Sambar and Tanjong Loempoer (Lumpur), about 20 miles eastward, is too shoal to be of any importance to shipping. The stream may attain a rate of over 2 knots in the vicinity of the entrance points, but in the

Charts 1066, 941a, 1263.

Chart 1964.

bay the rate is mostly dependent on the wind. The western shore is rocky for a short distance northward of Tanjong Sambar, thence there is a narrow sandy beach, with casuarina trees, broken in places by hillocks of sandstone and white clay rising steeply from the sea; behind these the land is marshy and densely wooded; the eastern shore is muddy and covered with bush. Tanjong Loempoer is a low, muddy point, of a lighter colour, due to the thick undergrowth, than the land behind. Two 2¾-fathom (5^m0) patches lie 4½ and 6½ miles, respectively, east-south-eastward of Tanjong Sambar. Batu Mogoeng (Mogung), a coral reef, which almost entirely covers at high water, lies nearly in the middle of the bay and about 10½ miles east-north-eastward of the same point. A rock, with a depth of 2 feet (0^m6) over it, lies about 1¼ miles south-westward of Batu Mogoeng, and a 1½-fathom (2^m7) patch lies about one mile northward. Ayer Hitam kechil flows out on the western side of the bay, but the bar off the mouth nearly dries, although inside it the river is fairly deep. Ayer Hitam besar, at the head of the bay, is about 2¾ cables wide at its mouth, but is only navigable for praus; about 4 miles westward of the mouth and close to the coast is a hillock, 202 feet (61^m6) high, with a noticeable, yellow, round-topped tree on the summit. Small vessels can anchor off the mouth of Ayer Hitam besar; landing can be effected anywhere, except immediately southward of the mouth. The shores of the bay are uninhabited, and the nearest settlement of any importance is Padang Pelingkai, about 20 miles up Ayer Hitam besar.

Sungei Djelai (Jelai) discharges about 5½ miles north-eastward of Tanjong Loempoer (*Lat. 3° 02′ S., Long. 110° 39′ E.*). The channel over the bar has a depth of about 3 feet (0^m9) in it.

The large village of Matoea (Matua) is situated on Tanjong Koeala Djelai (Kuala Jelai), the eastern entrance point of the river. Koeala Djelai (Kuala Jelai) village stands close within the eastern side of the entrance to the river, and exports forest produce. There are several islets above this village. Soekamara village stands on the left bank, at the junction of the river with Sungei Bila, about 35 miles above the mouth, and is the headquarters of a native Government official; there is a Custom house just below this village. Small vessels of the Koninklijke Paketvaart Maatschappij visit Sungei Djelai regularly.

Reede Soekamara is bounded by the parallel of the roadstead boundary mark on the left bank of Sungei Bila, at its junction with Sungei Djelai, and by the meridian of a similar mark on the left bank of Sungei Djelai, about 4 cables above the Custom house flagstaff.

Between Tanjong Koeala Djelai and Tanjong Selaka, about 15 miles east-south-eastward, the coast is bordered by a narrow sandy beach, and this continues for about 22 miles farther eastward, although in the latter part it is occasionally varied by cliffs of white clay; thence the coast consists of mud, covered with mangroves, for a distance of 5 miles, to the mouth of Sungei Kota Waringin. At Tanjong Selaka there is a sandy beach, with casuarina trees behind, but the point is not easy to identify against the land behind; a noticeable tree stands on a hillock, 69 feet (21^m0) high, on the coast about 5½ miles east-north-eastward of Tanjong Selaka.

Bank van Selaka, with depths of less than 3 fathoms (5^m5) over it, extends about 15 miles south-westward from Tanjong Selaka. Vessels of deep draught are recommended to keep out of sight of land when

Charts 1066, 941a, 1263.

Chart 1964.

passing this point. The bank causes some local irregularities in the direction of the current, which may set across it at a rate of 2 knots.

Sungei Kota Waringin.—Buoy.—Sungei Kota Waringin discharges at the head of the bight between Tanjong Selaka and Tanjong Pengoedjan (Pengujan), about 35 miles eastward. The mouth can be identified by a conspicuous clump of trees close eastward of Tanjong Sapoe (Sapu), the eastern entrance point; the coast eastward, as far as Tanjong Pengoedjan, consists of low hillocks, visible from a distance of 18 miles, bordered by a white sandy beach.

The entrance to the river is about 2 miles wide, but this is greatly reduced by the islands Soemadra (Sumadra) and Kelapa, and banks, which partly dry, lying in the middle. The western channel, which is marked by unofficial beacons, has a least depth of 2 feet ($0^{m}6$) in it and can be used by vessels with a draught of from 6 to 8 feet ($1^{m}8$ to $2^{m}4$) at high water; the eastern channel is only suitable for boats and praus. A conical approach buoy, painted red and black in horizontal bands and surmounted by a ball, is moored about 2 miles southward of Tanjong Poetri (Putri) (*Lat. 2° 55′ S., Long. 111° 23′ E.*), the western entrance point of the river, but it was reported, in 1946, to have disappeared.

Karang Anjar village stands about 17 miles up the river, on the left bank, and is of little importance; there is a wharf here. About half a mile above this village the river divides into two branches, the western named Sungei Lamandau, and the eastern Sungei Aroet; a post, surmounted by a white board, stands on Tanjong Koeala Aroet, the point at the junction of these two rivers. Kota Waringin Lama, a fairly large village, is situated on Sungei Lamandau, about 55 miles from the sea, and a depth of 12 feet ($3^{m}7$) can be carried up as far as this village, although the river is very tortuous. Pangkalan Bon or Soekaboemi, where the Rajah of the district resides, is situated on Sungei Aroet, about 21 miles from the sea, and this river is entirely clear up to the village, with a width of about half a cable and a depth of about 16 feet ($4^{m}9$) in mid-channel. During the dry season the tidal streams are not strong here.

Reede Pangkalan Bon is bounded by the meridians of the roadstead boundary marks on the right and left banks of two tributary rivers, Sungei Boelin and Sungei Boön, at their junctions with Sungei Aroet, at Pangkalan Bon.

There is a Custom house and a small pier on the left bank of Pangkalan Bon; the dwellings of the Rajah and Government official, a Government warehouse, and a mosque, are situated on the left bank, and Chinese traders live on the right bank. Both banks are under water during the North-west monsoon, and houses of the village are, therefore, built on piles. Pangkalan Bon is visited regularly by small steamers of the Koninklijke Paketvaart Maatschappij, sometimes calling at Karang Anjar village; a good road connects these two villages, and another road runs from Pangkalan Bon to Koemai.

Directions.—A vessel, after passing the approach buoy, should steer to pass westward of the unofficial beacons and then steer for the western entrance point; when the southern extremity of Kelapa bears 090°, she should follow the western bank of the river at a distance of about a quarter of a cable.

Koemai baai.—Koemai (Kumai) baai includes the whole area of

Charts 1066, 941a, 1263.

O

water between Tanjong Pengoedjan and Tanjong Poeting (Puting), about 33 miles south-south-eastward. The western shore of the bay, for about 4 miles north-eastward of Tanjong Pengoedjan, rises steeply from the sea, and close northward of this point is a hillock, 182 feet ($55^{m}5$) high; thence to the mouth of Sungei Koemai (Kumai), which flows out at the head of the bay, the coast is fronted by a narrow sandy beach, with high trees behind.

Tanjong Poeting is low, flat, and covered with shrubs; owing to its light green colour it stands out plainly against the dark, wooded land northward and eastward; a current, with a rate of 2 knots, may set round Tanjong Poeting. Telok Kramat, a small bay, lies 3 miles north-north-eastward of the point; the remainder of the eastern shore of Koemai baai to the mouth of Sungei Koemai consists mainly of sand and mud. A clump of high trees close southward of Telok Kramat, appears as an isolated islet from a distance, and is very noticeable.

Dangers.—Beacons.—A flat, with depths of less than 3 fathoms ($5^{m}5$) over it, extends about 9 miles south-south-westward from Tanjong Pengoedjan; Baras basah banken, which are three white sandbanks and not easily seen, lie on the northern part of this flat. On the northernmost bank there is an islet covered with casuarina trees. A small reef, with a depth of 6 feet ($1^{m}8$) over it, lies nearly 7 miles south-eastward of Tanjong Pengoedjan, and is marked by a black beacon surmounted by a cone.

Sangora banken, about 14 miles south-eastward of Tanjong Pengoedjan, and from 5½ to 8 miles off the eastern side of the bay, have three drying patches of white sand on them, on the southern of which are some huts; two bare islets lie on the two northern patches. The shape of the banks often changes, but their position remains constant. A rock, with a depth of 1½ fathoms ($2^{m}7$) over it, lies about one mile westward of the southern end of Sangora banken, and is marked by a white beacon surmounted by a ball. Numerous shoals, which are steep-to, and seldom marked by discoloration, including Sapagar bank, which has a patch of sand on it, which dries, lie north-eastward of Sangora banken. A reef, with depths of less than 6 feet ($1^{m}8$) over it, lies about 3 miles westward of the entrance to Sungei Baroe (Baru), which flows out about 18 miles northward of Tanjong Poeting. A bank, with depths of less than 3 fathoms ($5^{m}5$) over it, extends for about 5 miles westward and 4 miles south-westward from Tanjong Poeting (*Lat. 3° 31′ S., Long. 111° 46′ E.*).

Sungei Koemai.—Light.—Sungei Koemai, at the head of Koemai baai, has a wide mouth, though somewhat obstructed by banks, the western side being the deeper. Inside the entrance the depths increase rapidly, and off Koemai village, about 13 miles from the entrance, there is good anchorage, in a depth of about 6 fathoms ($11^{m}0$), off the flagstaff; the river here is about 3¾ cables wide.

Reede Koemai is bounded by the parallels of the roadstead boundary marks situated on the right bank of the river about 5 cables below and 6 cables above the flagstaff at the office of the district chief of Koemai.

A light is exhibited, at an elevation of 13 feet ($4^{m}0$), from a wooden post, on the pier at Koemai.

Koemai is the headquarters of a native chief, representing the Rajah of Kota Waringin; the place is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and there is a good road to

Chart 1964.

Pangkalan Bon, and also to Koeala Pemboeang, on Sungei Pemboeang.

Sungei Koemai is deep and wide for about 9 miles above Koemai, as far as the tributary Sungei Ranggit, which flows out on the right bank.

Tidal streams.—The tidal streams in Koemai baai are semi-diurnal, and off the mouth of Sungei Koemai change fairly regularly every six hours. The farther up-stream the more the out-going stream predominates in duration. At Tanjong Kloeang (Kluang), situated about 2¾ miles north-north-eastward of Tanjong Pandan, the western entrance point of Sungei Koemai, the maximum rate of the out-going stream observed was 3 knots, and the in-going stream 2 knots.

Directions.—Beacons.—A vessel making for Sungei Koemai from eastward should exercise caution when rounding Tanjong Poeting, as little is known of the tidal streams; it may be rounded by sounding, giving it a berth of about 8 miles, and when the vessel is this distance westward of the point she should steer 349° towards Tanjong Pangoedjan; the latter point generally comes into sight at a distance of about 18 miles, before reaching Sangora banken. She should continue on this course until she is 15 miles from Tanjong Pangoedjan, when she should alter course to 017° for Tanjong Pandan, which will be sighted shortly. Should soundings, or the sight of surf, show that the vessel is too close to the Baras basah banken, she should alter course more to the eastward, taking care to pass eastward of the black cone beacon on the reef about 7 miles south-eastward of Tanjong Pengoedjan. She should keep Tanjong Pandan bearing 017° until Tanjong Pengoedjan bears 283°, or the 182-foot ($55^{m}5$) hillock, close northward, bears 285°, when she should alter course to about 007°, and when Tanjong Pandan bears 038° alter course to about 051°, rounding this point at a distance of about 3½ cables, and continuing at a distance of about 2 cables from the sandy beach between Tanjong Pandan and Tanjong Kloeang.

Tanjong Kloeang (*Lat. 2° 54′ S., Long. 111° 42′ E.*) terminates in a long sandy spit, nearly covering at high water, but is wooded with casuarina trees nearly up to its northern extremity; there is an unofficial beacon, surmounted by a white rectangular board, about one mile south-south-westward of Tanjong Koeboe, and two similar beacons, one of which is situated about 4 cables southward of Tanjong Koeboe, and the other close northward of the point.

There is a mosque in Sungei Amang village, on the western side of the entrance, about 8 cables south-westward of Tanjong Koeboe. There is a rock, about 12 feet ($3^{m}7$) high, about one cable eastward of Tanjong Koeboe.

Care should be taken to avoid the shallow Telok Pangerangan, the wide bight opposite Tanjong Koeboe, and also a bank extending from the western side of the river, about one mile northward of Tanjong Koeboe. Northward of Telok Pangerangan the river is clear of dangers.

Chart 3161.

Coast.—Beacon.—The coast between Tanjong Poeting and Tanjong Siamok, 49 miles eastward, consists generally of mud covered with a monotonous undergrowth, and affords no noticeable landmarks; the 5-fathom ($9^{m}1$) line lies 12 miles from the coast in places, and there are many shoals within this depth. On Tanjong Siamok the undergrowth

Charts 1066, 941a, b, 1263, 2759a.

Chart 3161.

is higher than eastward or westward of this point, and from a distance it appears as an islet.

Sungei Pemboeang (Pembuang), which discharges on the eastern side of Tanjong Siamok, has a wide mouth, divided into two narrow channels by Gosong Awing, a sandbank, which dries. The western or main channel has a depth of 6 feet ($1^{m}8$) on the bar at half-tide, where there is often a heavy surf in the South-east monsoon. A white beacon surmounted by a ball stands just outside the entrance to the western channel. The principal settlement is Koeala Pemboeang (Kuala Pembuang), standing on moderately high ground along the western bank, about 2¾ miles within the entrance; Koemai (Kumai) village stands about one mile higher up, on the same side of the river. Small steamers of the Koninklijke Paketvaart Maatschappij call here regularly.

The coast between Tanjong Siamok and Tanjong Bandaran, 34½ miles north-eastward, consists mostly of a sandy beach with monotonous undergrowth behind; about midway along this part of the coast there is a wooded part of higher and darker trees. Close westward of Sungei Lasoen (Lasun), a small river flowing out about 11 miles south-westward of Tanjong Bandaran (*Lat. 3° 08′ S., Long. 113° 03′ E.*), there is a somewhat more open part, where a number of white trunks of dead trees will be seen. The coastal bank, with depths of less than 3 fathoms ($5^{m}5$) over it, extends as much as 6½ miles offshore and is stated to be extending seaward.

Sampit baai.—Buoyage.—Sampit baai is considered as the area within the line joining the mouth of Sungei Lasoen and the southern extremity of the drying banks extending about 3½ miles southward from Tanjong Bakai, about 27 miles eastward. Tanjong Bandaran is a narrow tongue of sand with a row of casuarina trees on its extremity; a sandbank with a least depth of one foot ($0^{m}3$) over it, extends about 3 miles north-eastward from the point, and is stated to be extending.

In the northern part of Sampit baai is an inner bay, entered between Tanjong Bandaran and Tanjong Tjemati (Chemati), a point difficult to identify, 10½ miles eastward, into which Sungei Sampit flows; the greater part of this inner bay is encumbered with mudbanks extending from the shore.

Tanjong Bakai is fairly noticeable, as the trees on it are higher than those in the vicinity. Between Tanjong Kempeng, about 5½ miles north-westward of Tanjong Bakai, and the mouth of Sungei Bakoe (Baku), 3¾ miles farther north-westward, casuarina trees grow along the shore and behind them are four rows of trees, having the appearance of hilly ridges from a distance.

A conical buoy, painted in red and black bands, and surmounted by a ball, lies about 3¾ miles east-north-eastward of Tanjong Bandaran.

A light-buoy, painted black, exhibiting a *white flashing* light of *four seconds* duration *every twelve seconds*, is moored about 3¼ miles north-north-eastward of Tanjong Bandaran.

Sungei Sampit.—Depths.—Beacon.—In the channel through the bar off the entrance to Sungei Sampit there is a least depth of 8 feet ($2^{m}4$); over the inner bar, near Bassiri, about 10 miles up the river, there is a least depth of 8 feet ($2^{m}4$). Elsewhere, a depth of at least 16 feet ($4^{m}9$) can be carried up to Sampit village, 35 miles up the river.

Charts 1066, 941b, 1263, 2759a.

Chart 3161.

An unofficial beacon, surmounted by a white rectangular board, stands on the left bank at the entrance.

From 8 to 12 miles above the entrance of Sungei Sampit the three villages Samoeda, Bassiri, and Kramat are situated in a continuous line along the western bank. There is a pier at Bassiri. A rock, with a depth of less than 6 feet ($1^{m}8$) over it, lies about 3¾ cables northward of the pier at Bassiri, and another rock, with a depth of 9 feet ($2^{m}7$) over it, lies north-westward of this rock. Hanaoet is an islet lying on a shoal bank in the middle of the river about one mile northward of this pier. Lepeh, an islet, lies in the middle of the river about 2¾ miles above Hanaoet. Palangsian is a Malay settlement, built on rafts, on the western bank of the river, about 15 miles above Bassiri.

Sampit village, situated on the western bank about 35 miles above the entrance of the Sungei Sampit, is the headquarters of a Government official; Sabrang village is situated on the opposite bank. There are several piers at Sampit. The water of the river is fresh in both monsoons. The place is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

The out-going stream is stronger and of longer duration than the in-going stream. The latter stream is appreciable 5 miles above Sampit.

Reede Sampit is bounded by lines drawn in a 126° direction and an 056° direction from the northern and southern roadstead boundary marks, respectively. The roadstead boundary marks are situated about 12 cables northward, and 13 cables southward, of the flagstaff at the Controller's house at Sampit. These marks were reported, in 1946, to have disappeared.

Tidal stream signals.—The following tidal stream signals are displayed from the pier at Sampit:—A white flag during the in-going stream, and a red flag during the out-going stream. No flag is shown at slack water.

Directions.—Tantoen (Tantun), about 2 miles south-eastward of Tanjong Bakai (*Lat. 3° 17′ S., Long. 113° 21′ E.*), is a good mark for vessels approaching Sampit baai; it is covered with high trees, and was formerly a separate island, but is now connected to Damar. A vessel from westward should continue on an easterly course, outside the 5-fathom ($9^{m}1$) line, after passing Tanjong Siamok, until the depth permits her to steer for the red and black conical buoy off Tanjong Bandaran, bearing 350°; she should approach on this bearing until the black light-buoy bears 298°, when she should steer for it on this bearing, which is in line with the northern point of the river, which cannot always be distinguished. The vessel will thus pass one mile clear of the outer edge of the bank extending 3 miles north-eastward from Tanjong Bandaran. She should pass southward of the light-buoy, and when the white beacon on Tanjong Seramboet, situated on the eastern side of the entrance of Sungei Sampit, 8½ miles northward of Tanjong Bandaran, bears 357°, the vessel should steer for it on that bearing. Vessels with local knowledge only should proceed into the river.

A vessel leaving the river at night should steer for the light-buoy, bearing 174°, altering course to 126° just before reaching it, passing north-eastward of the red and black conical buoy off Tanjong Bandaran, and thence into the bay.

Charts 1066, 941b, 1263, 2759a.

Chart 3161.

Sungei Mendawai.—Beacons.—Sungei Mendawai discharges on the eastern side of Tanjong Bakai, and has two entrances: Loeloehan Pahang, the southern entrance, lies between the sandbanks, at the southern end of which is Gusong Schoenjer (Schunjer bank) extending southward from Tanjong Bakai and those extending from the western side of Tantoen and Damar; Selat Djeroedjoe (Jeruju), the eastern entrance, runs along the northern side of Damar. The least depth on the bars of these two entrances is about 2 feet ($0^{m}6$), but Selat Djeroedjoe is the deeper and safer entrance when its bar has been crossed. There is frequently a heavy surf in the entrance at the height of the South-east monsoon.

The channel over the bar of Selat Djeroedjoe is marked by a white beacon, surmounted by a ball, and two black beacons, each surmounted by a cone.

Small vessels with local knowledge with a draught not exceeding 7 feet ($2^{m}1$) can enter Loeloehan Pahang from westward, at high water, by Loeloehan Schoenjer, the narrow channel between Gusong Schoenjer and the bank extending southward from Tanjong Bakai.

Pegatan village stands just within the mouth of Sungei Mendawai, on the western side of the entrance, and Baning is an island close offshore opposite; Boeroeng (Burung), an island close northward of Baning, can be passed on either side. Mendawai, a Malay settlement, is situated on the left bank, about 19 miles above the entrance, and is visited regularly by small vessels of the Koninklijke Paketvaart Maatschappij. The river is navigable by vessels that can enter by Selat Djeroedjoe, as far as Samba village, at the junction of Sungei Samba with Sungei Mendawai, 150 miles above Mendawai village. Owing to the changing nature of the banks, and the consequent alterations in the channels, vessels without local knowledge should not enter Sungei Mendawai without a pilot.

Tidal streams.—In Sungei Mendawai the out-going stream commences at, or very shortly after, high water; the in-going stream commences from one to 2 hours after low water of the diurnal tide. At Mendawai the in-going stream commences 3 hours after low water.

Off-lying bank.—A bank, with a depth of 7½ fathoms ($13^{m}7$) over it, was reported, in 1945, to lie about 23½ miles south-south-westward of Tanjong Bakai (*Lat. 3° 17′ S., Long. 113° 21′ E.*).

Coast.—Dangers.—Sebangan baai, entered between Tantoen and Tanjong Malatajoer (Malatayur), 15 miles south-eastward, is of little importance to general shipping. The shores are low, muddy, and overgrown with mangroves and low shrubs, except in the vicinity of the mouth of Sungei Sebangan, at the head of the bay, where there are some high trees. Some distance inland from the head of the bay is Gunong Kaki, a saddle-shaped hill, 743 feet ($226^{m}5$) high, the summits of which are in line when seen from the middle of the bay. Sungei Sebangan is fairly deep, but the shoal bank at the head of the bay renders it inaccessible for vessels except those of shallow draught; there are no settlements, but praus from Sampit and Pegatan proceed up the river to collect forest produce.

Batu Mandi, about 4 miles south-eastward of Tantoen, is a very noticeable pointed rock of a greyish-yellow colour, 36 feet ($11^{m}0$) high, and other rocks lie close to it; Boeaja (Buaja), about one mile north-eastward of Batu Mandi, is a flat, rocky islet only about 2 feet ($0^{m}6$)

Charts 1066, 941b, 1263, 2759a.

Chart 3161.

high. Several rocks, which dry, lie on the bank surrounding Batu Mandi and Boeaja, but they are generally marked by surf when covered, and the same applies to those on the detached banks about half a mile north-westward and 2 miles north-eastward of Boeaja, respectively.

Tanjong Malatajoer, like the adjacent coast, is low and covered with mangroves, with high trees behind; the drying coastal bank extends about 3 miles offshore northward of this point.

Chart 3029.

Coast.—Danger.—The coast between Tanjong Malatajoer and Tanjong Sangiang, the western entrance point of Sungei Kahajan or Groote Dajak rivier, about 28 miles eastward, is low; the mangroves, backed by high trees, continue as far as Tanjong Koemba (Kumba), 7½ miles eastward of Tanjong Malatajoer, and the remainder is covered with high trees, except for a sandy strip between Tanjong Tjimantan (Chimantan) and Tanjong Boedjoer (Bujur), situated about 2 and 9 miles, respectively, eastward of Tanjong Koemba.

A vessel approaching Tanjong Malatajoer, bearing between 000° and 022°, will sight the trees on the point later than those on the Tantoen peninsula (page 367), on the western side of Sebangan baai.

Bank van Malatajoer (Malatayur), with depths of less than 3 fathoms ($5^{m}5$) over it, extends from the above coast to a distance of 30 miles southward of Tanjong Malatajoer, and there are a few 2¾-fathom ($5^{m}0$) patches eastward of this bank; and a 2-fathom ($3^{m}7$) patch lies about 26 miles east-south-eastward of the point. This bank causes great irregularities in the currents along the coast, so vessels should keep out of sight of land when passing this locality.

Sungei Kahajan.—Tanjong Damaran (*Lat. 3° 19′ S., Long. 114° 05′ E.*), on the eastern side of the entrance and about 3 miles north-eastward of Tanjong Sangiang, has some high trees on it, darker than the surrounding verdure. The least depth in the channel over the outer bar, which is not marked, is 6 feet ($1^{m}8$), increasing to 10 and 15 feet ($3^{m}0$ and $4^{m}6$) between Tanjong Sangiang and Tanjong Damaran; on the inner bar, which lies between a conspicuous tree on the left bank, about 4 miles north-north-eastward of Tanjong Damaran, and Tanjong Tadjoer (Tajur), about 2 miles farther northward, there is a least depth of 12 feet ($3^{m}7$) in the channel along the western half of the river. Except for these bars, a depth of at least 20 feet ($6^{m}1$) can be carried as far as the village Pangkoh, about 18 miles up the river. At spring tides a vessel with a draught of 13 feet ($4^{m}0$) can enter the river at high water.

In the entrance the out-going stream may attain a rate of 3½ knots, and the in-going stream 2 knots.

Pangkoh, situated along the right bank of the river, is the head-quarters of a missionary and a native chief. Pulau Mintin lies near the left bank about 15 miles above Pangkoh, and can be passed close to on either side; Pulau Tangang lies near the opposite bank there. Poelang Pisau village is situated on the left bank, about 22 miles above Pangkoh; a boat, with a draught of 3 feet ($0^{m}9$), can reach Bandjermasin, (page 375) from here through canals and Sungei Kapoeas. Between Poelang Pisau and Pahandoet village, about 60 miles above Pangkoh, the river is about 2 cables wide and can be navigated without great difficulty at all times by vessels with a draught not exceeding 10 feet ($3^{m}0$); small craft, with a draught of 5 feet ($1^{m}5$), can easily reach

Charts 1066, 941b, 1263, 2759a.

Chart 3029.

Rawi, an important native place for collecting forest produce, about 17 miles above Pahandoet. The in-going tidal stream is perceptible as far as this place.

Sungei Roengan, the principal tributary of Sungei Kahajan, flows out about 14 miles above Pahandoet on the right bank, and is only navigable by praus. During the rainy season the entire neighbourhood is under water, there being only an occasional patch of higher ground, on which there are usually a few huts. With high water level a small vessel, with a draught of 6 feet ($1^{m}8$), can proceed up the river as far as Koeala Koeroen village, in lat. 1° 04′ S., long. 113° 52′ E. but navigation becomes very difficult above Rawi, owing to sudden alterations in the width of the river, very hard banks of sand and gravel, and trunks of trees lying under water.

Directions.—The greatest depth over the outer bar of Sungei Kahajan is obtained by steering for Tanjong Damaran, bearing 354°, crossing the 3-fathom ($5^{m}5$) line on this course; when Tanjong Tawas, a wooded point about 7 miles south-eastward of Tanjong Damaran, bears 093°, the vessel should alter course to 336°, and continue on this course until Tanjong Perawan, situated on the west bank about 1¾ miles north-north-eastward of Tanjong Damaran, is open north-westward of that point, when she should steer 000°, hauling gradually eastward as the river opens; when she has passed Tanjong Damaran she should keep to the south-eastern bank. Vessels without local knowledge should not attempt to enter the river.

Sungei Kapoeas.—Tidal streams.—Sungei Kapoeas (Kapuas) or Kleine Dajak rivier discharges between Tanjong Tawas and Tanjong Pematang, about 4½ miles eastward; both these points may be identified by the high trees on them, as elsewhere in the vicinity the low land is covered with a monotonous undergrowth. About 2 miles south-eastward of Tanjong Pematang is a very noticeable tree, and a little farther south-eastward is Tjemara (Chemar) Lebat village, with some tall casuarina trees near it.

The least depth in the channel over the outer bar is 5 feet ($1^{m}5$); on the narrow inner bar, just northward of Tanjong Boengkok (Bungkok) (*Lat. 3° 14′ S., Long. 114° 21′ E.*), 12 miles within the entrance, there is a least depth of 16 feet ($4^{m}9$) from 1½ to 2¾ cables from the right bank. Elsewhere a depth of at least 23 feet ($7^{m}0$) can be carried up to Mandoemai, about 40 miles up the river. A vessel with a draught of 11 feet ($3^{m}4$) can enter Sungei Kapoeas at high water spring tides. In 1948, the depths in the entrance given above were reported to be unreliable.

At the entrance to Sungei Kapoeas, and as far as Mandoemai village, the changes in the direction of the tidal stream coincide locally with the times of diurnal high and low water. In the offing and in the whole area inside the large bight northward of the line joining the southern extremity of Malatajoer bank with Tanjong Selatan, the direction of the currents is entirely dominated by the tidal streams in Sungei Kahajan, Sungei Kapoeas and Sungei Barito.

Koeala Kapoeas village stands 26 miles up the river, on both banks of Sungei Poelau Petak, at its junction with Sungei Kapoeas, and is the residence of a Government official. There is a flagstaff close northward of Tanjong Benting, the western entrance point of Sungei Poelau Petak.

Charts 1066, 941b, 1263, 2759a.

Chart 3029.

Reede Koeala Kapoeas is bounded by the parallel of a position about 8½ cables below the flagstaff on the right bank of Sungei Poelau Petak, and by the parallel of Tanjong Benting.

There is a mission station on the eastern side of Sungei Poelau Petak at Koeala Kapoeas village, and a hospital. At the southern end of the village there is a mosque.

Praus can reach Bandjermasin (page 375) from here by the Andjir canal, which forms a direct route to Sungei Barito through Sungei Serapat; in the dry season, however, the water level in the canal is often too low even for praus.

Mandoemai village, on the right bank of Sungei Kapoeas, about 14 miles above Tanjong Benting, is a prosperous place with a mission station; good anchorage can be obtained here, but vessels should allow for swinging, as the tidal streams are appreciable here. A canal for praus leads from Mandoemai to Poelang Pisau, on Sungei Kahajan. Above Mandoemai the river becomes tortuous and navigation is difficult.

Sungei Poelau Petak has a total length of 31 miles and connects Sungei Kapoeas with Sungei Barito; it has an average width of about 2 cables, and can be easily navigated by a vessel with a draught of 12 feet ($3^{m}7$) and a length of 160 feet ($48^{m}8$). The bed of the river consists of hard sand, and the banks are covered with shrubs and trees, with grass flats sometimes on the shoaler sides.

Approach to Sungei Barito.—Aspect.—Tidal streams.— Sungei Barito discharges into the north-eastern part of the bight contained within the line joining the southern extremity of Bank van Malatajoer and Tanjong Selatan (*Lat. 4° 10′ S., Long. 114° 38′ E.*), about 63 miles eastward. The northern shore of this bight has been already described, with Sungei Kahajan and Sungei Kapoeas, but the aspect of this part of the coast is of little importance to vessels bound for Sungei Barito from westward, as they pass southward of Bank van Malatajoer by sounding and bearings of landmarks on the eastern side of the bight, the northern shore being mostly out of sight. Vessels making for Sungei Barito from either eastward or westward should never approach the eastern shore of this bight within a depth of 6 fathoms ($11^{m}0$); this is especially important at night and during the North-west monsoon, when there may be a considerable set in towards this shore. In the whole area northward of a line between the southern extremity of Bank van Malatajoer and Tanjong Selatan, the direction of the stream is dominated by the tidal streams of the rivers Kahajan, Kapoeas and Barito. A strong stream may set round Tanjong Selatan.

Charts 3029, 3021.

The following mountains are useful marks when approaching the land on the eastern side of the bight:—Meratoes (Meratus) gebergte (chart 941b), situated with its highest peak, which has an elevation of 4,238 feet ($1{,}291^{m}8$), about 37 miles north-eastward of Tanjong Selatan; this range runs parallel with the coast, from 15 to 20 miles inland, and, in the North-west monsoon, can be plainly discerned from a great distance, although in the South-east monsoon the atmosphere is too hazy, and in the transition periods the summits are generally obscured by clouds; Bira gebergte, about 7 miles northward of Tanjong Selatan, are the most useful landmarks in this vicinity and comprise the four

Charts 3029, 3021.

summits, Bira, 1,166 feet (355^{m}4) high, Koekoesan (Kukusan), Goesang (Gusang) and Tima; Pandan, 310 feet (94^{m}5) high, a somewhat isolated hill, 1½ miles south-westward of Goesang, is very easily identified and is visible to within one mile of the bar off Sungei Barito. Dardaringan, 1,217 feet (371^{m}0) high, and Keramian, 1,138 feet (346^{m}9) high, lie about 19 and 25 miles, respectively, northward of Tanjong Selatan; the former has a flat crest running east and west, and the latter is conical and sharp.

Eastern side of approach.—Light.—Dangers.—Tanjong Selatan is low, but can be identified from a considerable distance owing to the high trees on it. At night this point should not be rounded in a depth of less than 10 fathoms (18^{m}3), and by day in not less than 6 fathoms (11^{m}0).

A light is exhibited, at an elevation of 107 feet (32^{m}6), from a white iron framework tower, 98 feet (29^{m}9) in height, on Tanjong Selatan.

Chart 3029.

The coast between Tanjong Selatan and Tanjong Boeroeng (Burung) the eastern entrance point of Sungei Barito, is wooded with high trees. Datoe (Datu), close offshore and about 7 miles northward of the lighthouse on Tanjong Selatan, is a rocky, wooded islet, about 100 feet (30^{m}5) high to the tops of the trees; as it is the same colour as the land behind, it does not show up plainly. Pinting Belajang, a rock, which dries, lies nearly 7 miles northward of Datoe and about 1½ miles from the coast; there are a few dangers near the coast northward of Pinting Belajang, but none is outside the 3-fathom (5^{m}5) line, which extends from 1½ to 3½ miles offshore, except a 4¾-fathom (8^{m}7) patch, which lies about 18 miles south-westward of Tanjong Boeroeng (*Lat. 3° 33′ S., Long. 114° 31′ E.*).

A very noticeable white building stands on a steep, reddish part of the coast nearly 12 miles northward of Datoe. Tabanio village is situated on the coast about 18 miles northward of Datoe; Sungei Tabanio, which flows out close northward of the village, is navigable for praus, but the bar off the mouth dries at low water.

SUNGEI BARITO.—Sungei Barito, the largest and most frequented river on the south coast of Borneo, is navigable for small vessels with a draught of 7 feet (2^{m}1) for about 400 miles (*see* also below); vessels, the draught of which permits them to cross the bar off the mouth, can usually reach Boentoek village, about 150 miles up the river, and these vessels can reach Bandjermasin, situated on Sungei Martapoera (Martapura), a tributary of Sungei Barito, under all conditions.

The depths on the bar, in 1947, were as follows:—

Lowest low water . .	3½ feet (1^{m}1).
Highest low water . .	10 feet (3^{m}0).
Mean level. . . .	9 feet (2^{m}7).
Lowest high water . .	11½ feet (3^{m}5).
Highest high water . .	16½ feet (5^{m}1).

On the bar the bottom consists of an upper layer of mud resting on a firm under surface, so vessels can usually force their way through some inches; in some places, however, the mud is absent, and when such is the case the bottom is somewhat harder. A vessel steering badly through being hampered by the mud runs some risk of being

Charts 1066, 941b, 1263, 2759a.

Chart 3029.

turned completely off her course by the tidal stream, which does not always run in the direction of the channel.

A few miles above Tanjong Pedada Toea (Tua), the western entrance point of the river, are three islands, Kaget, Tempoeroeng (Tempurung) besar, and Tempoeroeng kechil; Tamban is an islet lying near the right bank, about 3 miles above Kaget and opposite the mouth of Sungei Martapoera.

Vessels with a draught of 12 feet ($3^{m}7$) and a length of 160 feet ($48^{m}8$) can proceed up Sungei Martapoera for about 15 miles above Bandjermasin; motor boats with a draught of 5 feet ($1^{m}5$) can reach Martapoera village, about 30 miles above Bandjermasin.

In February, 1901, a vessel with a draught of 12 feet ($3^{m}7$) and a length of 160 feet ($48^{m}8$) proceeded up Sungei Barito and anchored, in a depth of 22 feet ($6^{m}7$), off Moeara Teweh, a village about 260 miles up the river.

Lights.—Buoyage.—Beacons.—The channel over the bar off the entrance of Sungei Barito is marked as follows; a light-buoy, painted black and red in horizontal bands, exhibiting a *white flashing* light *every twelve seconds*, flash *four seconds*, is moored about 8 miles south-southwestward of Tanjong Boeroeng (*Lat. 3° 33′ S., Long. 114° 31′ E.*) and indicates the approach to the channel. The channel is marked by two light-buoys, the positions of which are changed as necessary; the southern light-buoy is white and exhibits a *green flashing* light of *two seconds* duration *every eight seconds*; the northern light-buoy is black and exhibits a *red flashing* light of *five seconds* duration *every twelve seconds*.

A white can buoy with a reflector is moored in the entrance, about 1¾ miles eastward of Tanjong Pedada Toea. There are also several beacons on the bar.

A light is exhibited, at an elevation of 13 feet ($4^{m}0$), from a white beacon, 16 feet ($4^{m}9$) in height, on Tanjong Poelantan (Pulantan), on the eastern side of the river, about 4½ miles northward of Tanjong Boeroeng.

A light is exhibited, at an elevation of 13 feet ($4^{m}0$), from a white beacon, 16 feet ($4^{m}9$) in height, on the southern side of the entrance to Sungei Djinga (Jinga) besar, about 7 miles northward of Tanjong Pedada Toea.

A red can buoy is moored in the entrance to Sungei Martapoera, about 6 cables eastward of Tamban.

Tidal streams.—The tidal streams, like the vertical movement of the water, appear to be of a semi-diurnal and a diurnal character, although the latter predominates. On the bar, and at the entrance to the river, the direction changes from 0 to 2 hours after the times of high and low water of the diurnal tide. The maximum rate of the ebb stream was observed to be 4 knots, about the period of the greatest declination of the moon; the rate of the flood stream seldom exceeds 2½ knots.

Towards the semi-diurnal neap tides, which fall three days before the quarters, the out-going stream continues for about 16 hours, and the in-going stream from 6 to 8 hours. In addition, climatic influences in the upper reaches of the river cause great irregularities.

In Sungei Martapoera, as far up as just above Bandjermasin, the changes of the tidal streams occur practically at the same time as

Charts 1066, 941b, 1263, 2759a.

Chart 3029.

those of the tides; the ebb stream is stronger than the flood stream, but it only exceeds a rate of 2 knots in the wet season.

Anchorage.—Caution.—In the mouth of Sungei Barito the holding ground is very bad in places; in order to avoid the risk of fouling the inner buoys, vessels should not anchor southward of a line drawn in a 270° direction from Tanjong Boeroeng.

Tidal stream and navigation signals.—The following tidal stream signals are displayed by means of white signal marks at the down-stream end of the commercial pier at Bandjermasin by day:—

A cylinder, with a cone point up, above it, and a cone, point down, below it.	Slack water.
A cylinder, with a cone, point up, above it.	Flood stream.
A cylinder, with two cones, points up, above it.	Strong flood stream.
A cylinder, with a cone, point down, below it.	Ebb stream.
A cylinder, with two cones, points down, below it.	Strong ebb stream.

Navigation signals are displayed by means of white signal marks from the flagstaff near the Harbour office at Bandjermasin, and from the signal station on the southern side of the entrance to Sungei Martapoera. *See* page 13.

In addition to the navigation signals the following International Code signal may be displayed from the above-mentioned signal stations:—

I.L. You must remain where you are.

The following International Code signals may be displayed by vessels and will be repeated to Bandjermasin:—

(*a*) by day:—

B—I am carrying light inflammable material.

Q—My vessel is healthy (not infectious). I request pratique.

W—I require the harbour doctor.

I.J.—I have the mail onboard.

S.T.—I require the police.

W, with the relative Company flag above—I require the Company doctor.

Q, with the third substitute pendant above it—I have a suspected case of sickness onboard.

(*b*) at night:—

A *red* light over a *white* light: I require medical assistance.

Three lights in the form of a triangle, the upper light *white*, the others *red*: I require the police.

A white triangle over a red ball indicates that the vessel lying alongside the commercial pier can proceed, and that the passage of all other vessels is prohibited. This signal will be displayed from a quarter of an hour before to a quarter of an hour after the departure of the vessel concerned.

Obstructions.—Two obstructions extend from the shore one on either side, about 2 miles within the entrance to Sungei Barito; the seaward end of that on the western side is situated about 1¼ miles west-south-westward of Tanjong Poelantan light-structure (*Lat. 3° 29′ S., Long. 114° 31′ E.*), and that on the eastern side, 6¾ cables south-south-westward of the same light-structure.

Piers.—There is a small pier, with a depth of 16 feet ($4^{m}9$) alongside, on the eastern side of Sungei Barito, about 1¼ cables southward of the southern entrance point of Sungei Kween (page 347). There is

Charts 1066, 941b, 1263, 2759a.

Chart 3029.

a pier, with a depth of 11 feet ($3^{m}4$) alongside, close to the entrance of Sungei Telok Dalam, on the eastern side of Sungei Barito, about 1¼ miles southward of the same point.

Bandjermasin.—Bandjermasin, the residence of a Government official and one of the oldest trading ports in Borneo, is situated on the right bank of Sungei Martapoera and on the eastern side of an island, named Tatas, formed by the rivers Barito, Martapoera, and Kween; the latter stream, which is only navigable for small craft, branches off in a north-westerly direction from the Martapoera just above Bandjermasin, and flows into the Barito opposite the northern extremity of Pulau Kembang. The surrounding land is very marshy, and most of the houses are built on piles; the natives live along both banks of the river, and the Chinese along the left bank.

There are several piers at Bandjermasin. The large trading pier, situated near the Custom house, is 1,142 feet ($348^{m}1$) long, with a least depth of 7 feet ($2^{m}1$) alongside. About half a cable above this pier is the small trading pier, with a depth of 13 feet ($4^{m}0$) at its head. There are three small piers for Government vessels, with least depths of 15, 8 and 8 feet ($4^{m}6$, $2^{m}4$ and $2^{m}4$) alongside, respectively, above the large trading pier. There is a wooden bridge abreast the post office, about three-quarters of a mile above the piers.

The harbour limits of Bandjermasin are as follows:—

(1) The parallel of 3° 18′ S.

(2) The right bank of Sungei Barito, between the parallels of 3° 18′ S. and 3° 21′ 30″ S.

(3) The parallel of 3° 21′ 30″ S.

(4) Sungei Martapoera from its junction with Sungei Barito to the meridian of 114° 35′ 40″ E.

(5) Sungei Kween.

Harbour facilities.—Coal can be obtained except at times during the dry season. Provisions can be procured. Drinking water is difficult to obtain; in the North-west monsoon the river water is always fresh, and frequently so in the South-east monsoon. There is a hospital at Bandjermasin (*Lat. 3° 20′ S., Long. 114° 35′ E.*).

There is a slipway.

Bandjermasin is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and there is a regular service to Marabahan and other places farther up Sungei Barito.

There is a brisk trade with Java, Singapore, Europe and America.

Directions.—To obtain the greatest depth over the bar off the entrance to Sungei Barito, a vessel should steer to pass about 2¾ cables westward of the outer light-buoy in the approach, thence she should steer about 021°, passing about half a cable westward of the light-buoy painted white, and about 1¼ cables eastward of the light-buoy painted black, and then she can steer to pass westward of the white can buoy with a reflector. The channel over the bar frequently alters, and the buoyage is shifted accordingly; the directions given above are from the latest information which was available in 1948. No vessel should, however, attempt to enter without local knowledge.

From the white can buoy in the entrance the vessel should steer for the western extremity of Tempoeroeng kechil until the light-beacon on Tanjong Poelantan is abeam, when Tanjong Telan should be kept a little on the port bow; northward of this point the ship channel runs

Charts 1066, 941b, 1263, 2759a.

Chart 3029.

along the west bank of the river. There is a noticeable white Customs office on the southern extremity of Tamban (*Lat. 3° 21′ S., Long. 114° 31′ E.*); there is also a noticeable Custom house and signal station on the southern side of the entrance to Martapoera.

There is insufficient room for vessels exceeding 160 feet ($48^{m}8$) in length to turn abreast the large trading pier at Bandjermasin; such vessels, therefore, should turn between this pier and a bend in the river where it is about 360 feet ($109^{m}7$) wide, about a quarter of a mile below it, thence proceeding stern upstream to the pier.

Just below the bridge at Bandjermasin, where Sungei Pekapoeran enters the Martapoera, there is a sharp bend in the river, and there is another sharp bend by the mouth of Sungei Kween; caution should be exercised when negotiating these bends, as the channel is considerably narrowed by rafts and dwellings built out into the river.

Vessels which arrive in quarantine must anchor at the mouth of the Martapoera and await instructions.

Chart 3021.

COAST.—The coast between Tanjong Selatan and Tanjong Petang, about 85 miles east-north-eastward, is low and flat, with few landmarks until near the latter point. Meratoes gebergte (*see* page 371) runs parallel with the coast some distance inland, but, except in the North-west monsoon, the summits are seldom visible; Bira gebergte can, however, generally be seen from a distance of about 35 miles. A number of small rivers discharge along this part of the coast, the principal being the Senipah, Asam Asam, Satoei (Satui), Ansana, and Sebemban, the positions of which may be seen on the chart.

Until near Tanjong Petang the coast is almost uninhabited, although some small villages stand some distance up the rivers; within 5 miles westward of Tanjong Petang are the villages Saloemati (Salumati), Pedjalan, and Pegatan (*see* page 368). There is a noticeable clump of casuarina trees, the western side of which is the highest, near Saloemati, and on the western side of Pedjalan is a white mosque, which is noticeable when the sun shines on it.

Dangers.—A shoal, with a depth of 18 feet ($5^{m}5$) over it, lies about 4¾ miles east-south-eastward of the lighthouse on Tanjong Selatan, and a shoal, with a depth of 27 feet ($8^{m}2$) over it, lies about 11½ miles eastward of the same lighthouse; a shoal, with a least depth of 28 feet ($8^{m}5$) over it, lies 49 miles east-north-eastward of the lighthouse and 6¾ miles offshore. These are the only known dangers outside the 5-fathom ($9^{m}1$) line between Tanjong Selatan and Tanjong Petang, but it should be borne in mind that this depth line is subject to change. A coral patch, with a depth of 11 feet ($3^{m}4$) over it, lies one mile offshore and 9½ miles west-south-westward of the mouth of Sungei Asam Asam, which discharges 30 miles east-north-eastward of Tanjong Selatan lighthouse (*Lat. 4° 10′ S., Long. 114° 39′ E.*).

Several dangers lie within the 5-fathom ($9^{m}1$) line off the coast between the mouth of Sungei Tjoeka (Chuka), about 47 miles east-north-eastward of Tanjong Selatan lighthouse and Tanjong Petang. The principal of these are:—an 18-foot ($5^{m}5$) patch, Coehoorn (Kuhurn), also with a depth of 18 feet ($5^{m}5$) over it, lying about 4 miles south-south-westward and 5 miles south-south-eastward, respectively, of the mouth of Sungei Tjoeka; two rocks, which dry, and Vesuvius,

Charts 1066, 941b, 1263, 2759a.

Chart 3021.

a rock which dries, lie about 3 miles south-eastward and 6 miles eastward, respectively, of the mouth of the same river; Vesuvius, which is about 3 miles offshore, is difficult to distinguish when covered. A reef, which dries and which is often neither marked by surf nor discoloration, lies about 9 miles east-north-eastward of Vesuvius and about 4 miles offshore, with other dangers northward of it. Several reefs lie off the coast farther north-eastward; Betsy rif, about 2¼ miles southward of Tanjong Batoe (Batu), situated about 12 miles south-westward of Tanjong Petang, is the easternmost of these. The easternmost reef southward of Tanjong Kandang Aoer (Aur), situated 5½ miles south-westward of Tanjong Batoe, is often neither marked by surf nor discoloration.

Soembawa (chart 3017), on the eastern side of Pulau Laoet (Laut), bearing 069°, leads southward of all the above dangers. Vessels should keep in depths of not less than 8 fathoms ($14^{m}6$) when approaching Straat Laoet from westward. The tidal streams are felt close offshore, but in the offing, the influence of the current caused by the monsoon winds is felt, and a weak but constant south-west-going current.

Chart 3029.

OUTLYING ISLANDS AND DANGERS.—Shoals.—Janssens reef, with a least depth of 10 feet ($3^{m}0$) over it, and only slightly marked by discoloration, lies about 30 miles south-south-westward of Tanjong Selatan (*Lat. 4° 10′ S., Long. 114° 38′ E.*).

Chart 3021.

Duand reef has a depth of 4 fathoms ($7^{m}3$) over it, and lies about 22 miles south-eastward of Tanjong Selatan lighthouse, but its position is doubtful.

Chart 1066.

Arends eiland.—Arends eiland, about 52 miles southward of Tanjong Selatan, is 303 feet ($92^{m}3$) high. It is fringed by a reef, usually marked by discoloration, which extends as much as 2 miles from its south-eastern side and about one mile from its north-western side. Near the southern extremity of the reef is Tokang, an islet, 135 feet ($41^{m}1$) high. Some detached reefs lie close outside the fringing reef on the north-eastern and north-western sides of the island.

Fishing stakes may be met from 4 to 5 miles north-westward of the north-western side of the island.

During the survey a tidal stream, with a maximum rate of 1½ knots, set along the southern end of Arends eiland, causing a turbulent sea in the South-east monsoon; tide-rips occur off the south-eastern side of the island. Discoloured water, giving the impression of reefs, may be seen at some distance from this island and the Masalembo eilanden.

Masalembo eilanden.—Masalembo kechil, 22 miles south-south-westward of Arends eiland, is 257 feet ($78^{m}3$) high, and is fringed by a reef, which dries, and when covered, is usually marked by discoloration.

A detached 2½-fathom ($4^{m}6$) patch lies about three-quarters of a mile outside the edge of the fringing reef off the south-eastern side of the island; it is not marked by discoloration.

Masalembo besar, 4½ miles southward of Masalembo kechil, is 648 feet ($197^{m}5$) high on its eastern side, and is fringed by a reef which dries, and which, when covered, is usually well marked by discoloration.

Charts 941b, 1263, 2759a.

Chart 1066.

Raäs village (*Lat. 5° 35′ S., Long. 114° 26′ E.*) is situated on the shore of a bight on the southern side of the island; the fringing reef is broken in places and there is a sandy beach. A shoal, with a depth of 1¼ fathoms ($2^{m}3$) over it, lies nearly one mile west-south-westward of Raäs village. *See* view facing this page.

Charts 3017, 3021.

Laurot eilanden.—Laurot eilanden or Pulau Laoet kechil are a group of three islands and several islets lying about 65 miles south-south-westward of Tanjong Petang; they are high, rocky and densely wooded. Kalambau (chart 1066), the south-western island of the group, is 1,100 feet ($335^{m}3$) high, and has some detached rocks off its southern end, otherwise it can be approached closely. Kadapangan, the north-western island, is 935 feet ($285^{m}0$) high, and steep-to on all sides.

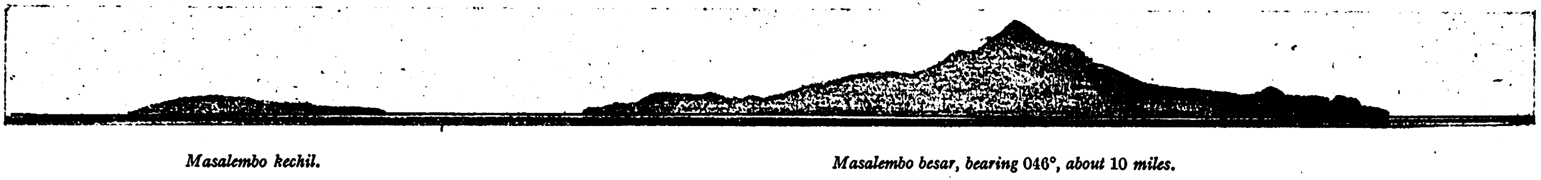
Mata Siri, the third island of the group, is 1,378 feet ($420^{m}0$) high, and is the only one that is inhabited. On its north-eastern side is Telok Soengei (Sungi), which affords safe anchorage in both monsoons, in depths of from 6 to 14 fathoms ($11^{m}0$ to $25^{m}6$). There is anchorage for small craft inside two detached reefs, with depths of 5 and 16 feet ($1^{m}5$ and $4^{m}9$) over them, which are not marked by discoloration. Pamelika and Koenjit (Kunyit) are two islets lying about 1¼ miles eastward and 1½ miles south-south-eastward, respectively, of the northern extremity of Mata Siri. There is a 6½-fathom ($11^{m}9$) patch about midway between these islets, but the passage between them and the main island is clear of dangers. Tjondong (Chondong) is an islet lying about 4 cables off the south-eastern side of Mata Siri, and another islet, 157 feet ($47^{m}8$) high, lies close offshore about 1¼ miles northward of the southern extremity of the island.

Moresses eilanden.—Moresses eilanden, about 17 miles north-north-eastward of Kadapangan, consist of one island and three islets, all wooded, with rocky coasts. Moresses or Marabatoea, the largest of the group, has a fairly regular, conical shape; there is a small sandy beach on the eastern side of this island, and also on the northern side of Noord eiland or Denawang. Noord steen and Zuid steen, 10 feet and 16 feet ($3^{m}0$ and $4^{m}9$) high, respectively, lie three-quarters of a mile and 1¼ miles, respectively, southward of Oost eiland or Pajong Pajongan. *See* view facing this page.

Anchorage.—Anchorage, fairly well sheltered in the South-east monsoon, may be obtained, in a depth of 12 fathoms ($21^{m}9$), about 1¼ cables off the shore reef at the northern end of Noord eiland, with the north-eastern extremity of that island bearing 125° and the south-western extremity in line with the summit of Moresses, bearing 190°. Iron ore is shipped here.

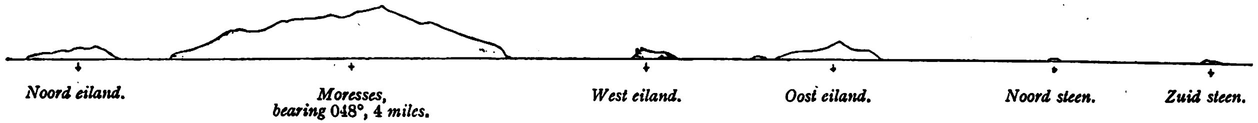
Charts 941b, 1263, 2759a.

To face page 378.


Masalembo kechil.
Masalembo besar, bearing 046°, about 10 miles.

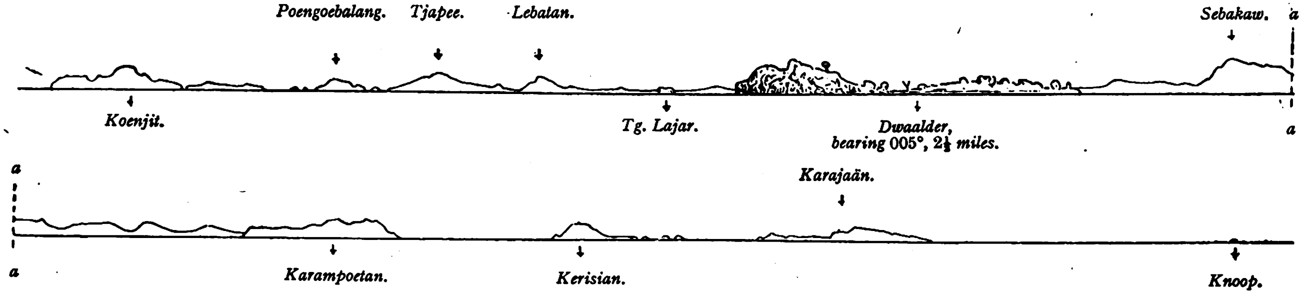
Masalembo eilanden.

(Original dated 1903.)



Moresses eilanden.

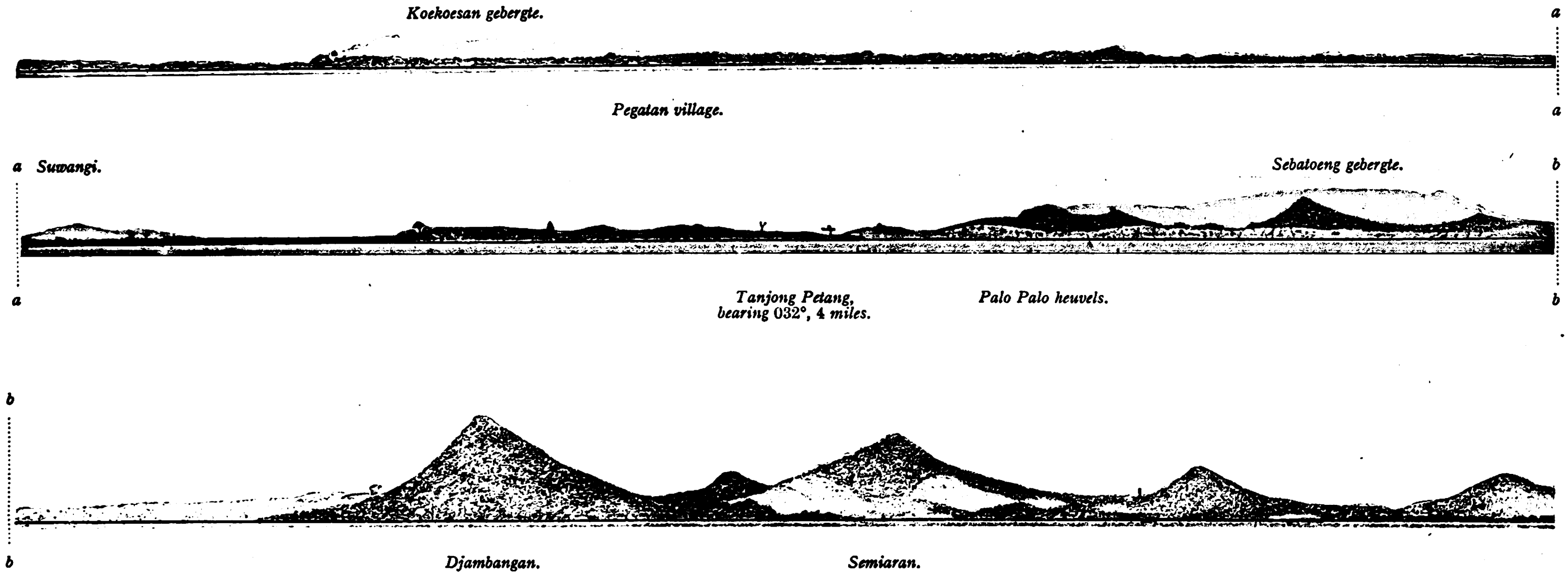
(Original dated 1931.)



View, in two parts, of southern end of Pulau Laoet.

(Original dated 1931.)

To face page 379.



View, in three parts, of southern entrance of Straat Laoet.

(*Original dated* 1903.)

CHAPTER XIII

MACASSAR STRAIT

Charts 2636, 2637.

MACASSAR STRAIT.—Macassar strait, known by the Dutch as Straat Makasser, is the great channel between the east coast of Borneo and the west coast of Celebes, and is about 400 miles in length. A considerable portion of the western side of the strait is occupied by a wide bank extending from the southern part of the east coast of Borneo, enclosing Kleine Paternoster eilanden in the northern part, and Lima eilanden in the southern part. The southern and widest part of this bank, southward of Semarang shoal (*Lat. 2° 43′ S., Long. 118° 07′ E.*), contains few islands, but many coral heads rise steeply from the bottom; these are usually of small extent, and most of them have a depth of over 5 fathoms ($9^{m}1$) over them. Except over a distance of about 60 miles at the southern end of the bank, covering Lima eilanden and Laurel riffen, there are large areas free from dangers, where vessels may cross between Borneo and Celebes, although vessels crossing the strait usually proceed westward and northward of the Kleine Paternoster eilanden.

Several groups of islands and shoals lie in the southern entrance to Macassar strait, including Spermonde archipel, which extends for many miles from the southern part of the west coast of Celebes. There are great depths along the Celebes side of the strait, and the route along the Borneo side is generally preferred, probably on account of the facility for anchoring there.

Climate and weather.—*See* page 17.

Local winds.—In Macassar strait the monsoons are not so marked, and their strength is less than in the Java sea. As most passages through are taken on one or other side of the strait, it is essential to remember that near the shores land and sea breezes blow through the whole year, and that the direction of the coast, with local topographical features, may greatly influence the force and direction of the wind then blowing in the body of the strait. Land breezes may be expected between about 1900 and 0700, and sea breezes from 1000 to 1700. Where the monsoon is strong on a lee shore, the land wind may not be felt at sea.

In April the easterly monsoon sets in, over the southern part of the strait, blowing from north-east to south-east, but calms and north-west winds are also experienced; this unsettled weather lasts until

Charts 941b, 1263, 2759a.

Charts 2636, 2637.

June, when the wind begins to blow with some regularity from the south-east quarter, occasionally shifting to south-westward; at night, in this month, the wind is mostly from east to south-east, but frequently, also, from south and south-west. These winds, blowing in opposition to the prevailing southerly current, produce a short and turbulent sea.

In September and October the wind and sea decrease, and changing through south and west, the winds blow from westward in November, and in December from south-west to north-west, but they cannot be relied on.

In January the monsoon is at its height, blowing from north-westward, with heavy squalls, much rain, and sea, which begin to abate in February, and in March there will be light breezes from north-west to north-east and east.

The greatest rainfall occurs from December to March, but there are showers in all other months, the least in July to September.

Squalls and thunderstorms are most frequent in December, but may occur in practically any month.

In the northern portion of the strait, the wind force is still less, the monsoons from northward and south-south-westward are uncertain and depend much on the strength of the several winds in the China and Java seas; the seasons are feebly defined, with much rain.

South-south-westerly winds begin in May, veering occasionally to west and north-west, and blow somewhat unsteadily. From June to September the monsoon is at its height, and south-south-westerly winds prevail day and night. In October the monsoon decreases in force, and is weakest in November, the wind sometimes veering northward and north-eastward. In December the general direction is north-west, in January north, and in February north-north-east winds blow with some steadiness, decreasing in April, when calms and uncertain breezes are expected.

There is less cloud in the northern than in the southern part of the strait, but the rain is heavier, and, in all parts, the fall is greater on the Borneo than on the Celebes side. The wet season is from November to March, and the dry season from July to September.

Squalls and thunder are infrequent, but mist, a rare phenomenon in these regions, is often seen.

Currents and tidal streams.—A southerly or south-south-westerly current is generally experienced in the open part of Macassar strait throughout the year. This current is derived from the constant North Equatorial current of the Pacific ocean (*see* page 6). It is sometimes, but not always, stronger on the eastern side of the strait, towards the Celebes coast. The average rate of the current for the whole year is about half a knot; it varies somewhat in different months. Maximum rates of about 2 knots have been recorded, but are infrequent.

In the great bight southward of Tanjong Mangkalihat there is said to be a constant northerly current along the Borneo coast with a rate of half a knot; just outside this current the general south-going current may sometimes be running at a considerable rate. Close under the Borneo coast the influence of the tidal streams is felt.

Pilots of long experience in Macassar strait state that during the South-east monsoon, from April to October, the current runs northward along the whole of the east coast of Borneo as far as Tanjong

Charts 941b, 1263, 2759a.

Charts 2636, 2637.

Mangkalihat, here it turns south-eastward and southward to join the general south-going current. This current is probably caused by the west-going monsoon current of the Java sea striking the east coast of Borneo and thus tending to pile up the water on the western side of Macassar strait. When the South-east monsoon is, or has been, strong, the northerly set off the entrance to Balik Papan baai attains a rate of from 1½ to 2 knots, while the southerly set off Ambo, the outer island of Kleine Paternoster eilanden, has been observed to attain a rate of 2 knots. Vessels crossing the strait from Balik Papan to the Celebes coast during the South-east monsoon may reckon on a northerly set for a distance of 75 miles from the coast of Borneo, and thence a southerly set for the rest of the passage.

During the South-east monsoon a vessel at anchor in a position about 10 miles east-south-eastward of Tokong hill lies heading about south-south-west, and does not swing; in the North-west monsoon, when the northerly coastal current is not found so far southward, the vessel lies with her head about north-north-east.

In the area within the 100-fathom (182^{m}9) line between the Lima eilanden and the Kleine Paternoster eilanden the tidal movements are weak and do not appreciably affect the general south-going current.

In the southern part of Macassar strait the direction of the south-going current is influenced by the prevailing monsoon. In June to September it is south-westerly and so, on emergence, passes into the west-going current of the Java sea. In November to March it becomes south-easterly and so passes into the east-going current of the Java and Flores seas. April and May are transition months, with the current in the western part of the strait turning south-westward as it emerges, while the part towards the Celebes coast turns south-eastward. In the transition month of October, the whole of the emerging current turns south-westward and westward.

Charts 3017, 3021.

WESTERN SIDE OF MACASSAR STRAIT.—Islets southward of Laoet. — Light. — Gebroeders or Sambargalang (*Lat. 4° 24′ S., Long. 116° 10′ E.*), about 20 miles eastward of Moresses (page 378), are two rocks covered with vegetation and joined to each other by a reef which nearly dries; from a distance they appear as three islets, as the southernmost has two summits, the northern of which is 148 feet (45^{m}1) high. A bank, with a depth of 56 feet (17^{m}1) over it, lies about 7 miles southward of Gebroeders.

Dwaalder or Birah Birahan, about 11 miles northward of Gebroeders, appears as two islets when seen from a distance either northward or southward, as it has a saddle in the middle. The reef, which fringes the islet, extends about 3 cables from the eastern side. A shoal, with a least depth of 6 fathoms (11^{m}0) over it, lies about 1½ miles north-eastward of Dwaalder.

A light is exhibited, at an elevation of 105 feet (32^{m}0), from a white beacon, 26 feet (7^{m}9) in height, on the summit of Dwaalder.

Chart 3017.

St. George bank, with a least depth of 29 feet (8^{m}8) over it, lies about 6 miles eastward of Dwaalder light-beacon.

Charts 3017, 3021.

Laoet.—Laoet (Laut), an island separated from the south-east

Charts 941b, 1263, 2759a.

Charts 3017, 3021.

coast of Borneo by Straat Laoet (Laut), is densely wooded, and traversed from north to south by a chain of mountains, attaining its maximum elevation of 2,325 feet (708$^{\text{m}}$7) at 4 miles from the northern end of the island in Sebatoeng (Sebatung) gebergte. About 7½ cables south-south-westward of Tanjong Pemantjingan (Pemanchingan), the north-eastern extremity of the island, is a conspicuous black hill, 281 feet (85$^{\text{m}}$6) high, which shows up plainly amidst the surrounding bright green country. Soembawa (Sumbawa), 1,551 feet (472$^{\text{m}}$8) high, and the highest summit in the middle part of the island, lies about 27 miles southward of Tanjong Pemantjingan; it is a good mark from westward; about 2½ miles west-north-westward of Soembawa is a flat summit, 1,059 feet (322$^{\text{m}}$8) high.

In the southern part of the island are several hills near the coast. Sebakaw, about 5 miles north-north-eastward of Tanjong Lajar (Layar), the southern extremity of the island, is 793 feet (241$^{\text{m}}$7) high; it is the highest of several hills difficult to distinguish from each other; it has three peaks, on the northern and lowest of which is a dark wood, on which is seen from an easterly and westerly direction one slender tree projecting above the others like a broom (*see* view facing page 378). About 7 miles north-eastward of Sebakaw, on the coast, is a very steep hill, 308 feet (93$^{\text{m}}$9) high, with a prominent round-topped tree on its summit; within 3½ miles north-north-eastward of it are three summits, the middle of which is 386 feet (117$^{\text{m}}$7) high, and very sharp.

Coal is found in the northern parts of Pulau Laoet, but the mines are now closed.

Western side of Pulau Laoet.—Light.—Koenjit (Kunyit), a high islet noticeable from eastward or westward, is connected to the south-western extremity of Pulau Laoet by a reef which dries, with some islets on it; the southern extremity of Koenjit rises steeply from the sea, and there is a hill in the middle of the islet, 439 feet (133$^{\text{m}}$8) high. A shoal, with a least depth of 6 fathoms (11$^{\text{m}}$0) over it, lies about 3 miles westward of the islet.

A light is exhibited, at an elevation of 440 feet (134$^{\text{m}}$1), from a white iron framework structure, 43 feet (13$^{\text{m}}$1) in height, on the summit of Koenjit.

The eastern end of a shoal, with a least depth of 3 fathoms (5$^{\text{m}}$5) over it, lies about 1¼ miles east-south-eastward of Koenjit.

The coast between Koenjit and Sebanti village, 8 miles northward, rises steeply to a line of hills, and is partly fronted by a sandy beach; Tjapee (Chapee), a hill, 528 feet (161$^{\text{m}}$0) high, has a large, dark wood on it, and Lebatan, about 2 miles farther northward, has a high, noticeable tree on its sparsely wooded summit. There are two sloping coconut trees near Sebanti, but this village is not visible from seaward.

Tanjong Kalidoepan (Kalidupan) (*Lat. 3° 54′ S., Long. 116° 03′ E.*), 2¼ miles northward of Sebanti, is a low point covered with high trees. The coastal reef extends nearly one mile westward from Tanjong Kalidoepan; Tokong, an islet which appears as two small islets from westward, lies on the south-western edge of this reef, and there are also several rocks above water. Semiaran, on the eastern side of the entrance to Straat Laoet, in line with Tanjong Laoeran (Lauran), about 7 miles southward, bearing about 000°, leads about one mile westward of the coastal reef, in a depth of 5½ fathoms (10$^{\text{m}}$1).

Charts 2637, 1066, 941b, 1263, 2759a.

Charts 3017, 3021.

Tanjong Karamboe (Karambu) lies about 3½ miles northward of Tanjong Kalidoepan, and has the same appearance; the coastal reef between these two points extends as much as one mile offshore. Karamboe (Karambu) village, near the point, is not visible from seaward. Sekatoeng (Sekatung) village is situated on the northern side of the mouth of a small creek 5½ miles northward of Karamboe; there is a dark group of casuarina trees at the northern end of the village, and a noticeable isolated hut near the northern entrance point of the creek.

Tanjong Laoeran (Lauran), 2 miles north-north-westward of Sekatoeng, is one of the most noticeable points along this coast, and is formed by a prominent, rocky hill, 262 feet ($79^{m}9$) high, covered with straight trees with white trunks; a rock above water lies on the drying coastal reef close northward of this point, and stands out from the other rocks in the vicinity owing to its light brown sides and grey top. Tanjong Semisir, about 3 miles north-north-westward of Tanjong Laoeran, is rocky and thickly wooded; two round-topped trees on it are noticeable from southward.

The coastal bank, with depths of less than 3 fathoms ($5^{m}5$) over it, extends about 2¼ miles westward and south-westward from Tanjong Semisir.

Chart 3021, plan of Laut strait.

STRAAT LAOET.—Straat Laoet (Laut) is often used by vessels bound for Setagin and Kota Baroe (Baru), at the northern entrance to the strait. The middle part of the strait is greatly obstructed by the islands of Soewangi (Suwangi) and Tampakan, as well as a number of banks; the main channel runs eastward of these two islands, but is so narrow and tortuous eastward of Soewangi, where there is a least depth of 15 feet ($4^{m}6$) in the fairway, that vessels can only navigate this part against the tidal stream or at slack water. The strait is well lighted, so can be used at night by vessels with local knowledge.

There is good anchorage in the strait except eastward of Soewangi, where the bottom is rocky.

Swept channel.—There is a swept channel leading from a position about 10 miles east-north-eastward of Tanjong Kemoening (Kemuning), through the northern entrance of the strait and thence southward, passing eastward of Soewangi to a position about one mile southward of that island.

Southern end of Straat Laoet.—Light.—Dangers.—Buoys.—Tanjong Petang, the western entrance point of Straat Laoet, is low. *See* views facing page 379.

A light (*Lat. 3° 37′ S., Long. 115° 58′ E.*) is exhibited, at an elevation of 59 feet ($18^{m}0$), from a white iron framework structure, 62 feet ($18^{m}9$) in height, on Tanjong Petang.

Pegatan village, near the coast about 1¾ miles westward of Tanjong Petang, is the headquarters of a Government official.

Reede Pegatan is the portion of Sungei Pegatan bounded by the meridian of the roadstead boundary mark situated about three-quarters of a cable westward of the pier, and by the parallel of a similar mark about 2 cables upstream of the pier.

Tanjong Kiwi, on the eastern side of the entrance to Straat Laoet and 3 miles south-eastward of Tanjong Petang, is a salient rocky point, with a noticeable white house close eastward of it. The eastern side of

Chart 3021, plan of Laut strait.

the strait, as far as Tanjong Serdang, about 9½ miles northward of Tanjong Kiwi, is high, rising in the northern part to the Palo Palo heuvels, which are low, and from southward appear as five small summits. Semiaran, about 2¼ miles north-eastward of Tanjong Kiwi, is 947 feet ($288^{m}7$) high, and can be identified from some distance outside the strait; Djambangan (Jambangan), about 2¾ miles north-eastward of Semiaran, is conical, with a double summit, 1,617 feet ($492^{m}9$) high, and is one of the most prominent mountains in Pulau Loet.

The western shore of the strait is densely wooded, the outer trees standing in the water at most places. Tanjong Kramat, on the western side of the strait, about 3½ miles north-north-eastward of Tanjong Petang, is the southern entrance point of Sungei Pegatan; this river is deep and is navigable for vessels with a length of about 160 feet ($48^{m}8$), which can turn round at a pier at Pegatan village, 5 miles from the entrance, where the river bends towards the coast. There is a Customs house at the mouth of Sungei Pegatan. There are fishing stakes along the shore between Tanjong Petang and Tanjong Kramat, and about 8 cables south-south-westward of the latter point is a conspicuous white house of the native Rajah. Tanjong Kresik Poetih (Putih), 5 miles northward of Tanjong Kramat, may be identified by a small strip of white sand; Kresik Poetih (Putih) village is situated about 1¼ miles southward of Tanjong Kresik Poetih, and Sungei Merah discharges close northward of this point.

The southern entrance to Straat Laoet is considerably narrowed by two large sandbanks, and a few smaller ones, leaving three fairways, the western of which, close to Tanjong Petang, is the most practical and frequented. Bank van Kramat, a small part of which dries, extends for 2½ miles in a northerly direction from a position near Tanjong Kramat; there is a passage along either side of this bank, but the eastern is preferable.

A black can buoy, No. 1, surmounted by a truncated cone, is moored close eastward of the southern extremity of Bank van Kramat, and a similar buoy, No. 2, marks the northern extremity of this bank.

Prohibited anchorage.—Anchorage and fishing are prohibited within a distance of 2¾ cables of the telegraph cable which crosses Straat Laoet between Tanjong Kramat and Tanjong Koemang Koemang (Kumang Kumang), about 2½ miles eastward. *See* page 14.

Chart 3021, plan of Laut strait and Channel east of Suwangi.

Middle part of Straat Laoet.—Batoe Litjin (Batu Lichin) is a large village on the western side of the strait, 2 miles northward of Tanjong Kresik Poetih (*Lat. 3° 29′ S., Long. 116° 01′ E.*), and on the southern side of the entrance to Sungei Batoe Litjin (Batu Lichin); a steel hawser, used for working a ferry, spans this river, so vessels should anchor below the landing stages of this ferry. About 2½ miles farther north-north-eastward is the entrance to Sungei Boeroeng (Burung); the island formed between this river and the strait is named Boeroeng (Burung). Anak Boeroeng, an islet, lies close off the eastern side of Boeroeng, about 1¼ miles north-eastward of the entrance to Sungei Boeroeng. About 5 miles northward of the north-eastern extremity of Boeroeng is the entrance to Sungei Troesan (Trusan), and several streams flow out between.

The eastern shore of Straat Laoet between Tanjong Serdang and

Charts 3017, 3014, 2637, 941b, 1263, 2759a.

Chart 3021, plan of Laut strait and Channel east of Suwangi. Tanjong Ajoen (Ayun), a low mud point, thickly wooded, about 12 miles north-north-eastward, is low and generally thickly wooded to the edge of the water; several rivers discharge into the strait. Seloekoetan (Selukutan) village, 7 miles northward of Tanjong Serdang, is plainly visible. Sungei Sawil, which discharges about one mile north-eastward of Tanjong Ajoen, has a village built on piles off its mouth.

Soewangi (Suwangi), lying on the western side of the strait, off the mouth of Sungei Batoe Litjin (Batu Lichin), is an island, 515 feet (157^{m}0) high, and completely covered with tall trees down to the water. Anak Soewangi (Suwangi) is a thickly wooded islet lying on the bank extending from the eastern side of Soewangi; some rocks, which dry, lie on this bank close eastward of Anak Soewangi. An extensive, dangerous bank extends from the coast of Pulau Laoet eastward of Soewangi, and several detached shoals lie in the channel between this bank and that extending from Soewangi.

Tampakan, 2½ miles north-north-eastward of Soewangi, is a low, thickly wooded island; a bank, which dries in places, extends nearly half-way across the strait from Boeroeng, and completely closes the passage westward of Soewangi and Tampakan except for small craft. A dangerous rock, which dries, lies on the eastern side of the channel, abreast Tampakan and about 8 cables north-westward of Seloekoetan village.

Gusong Pajoeng (Payung), with its southern extremity about one mile north-eastward of Tampakan, is a sandbank, which dries, and can be passed on either side, but the channel eastward of it is preferable.

Chart 3021, plan of Channel east of Suwangi.

Main channel.—Lights.—Beacons.—Buoyage.—Leading lights are situated on the south-eastern side of Soewangi; the front light is exhibited, at an elevation of 23 feet (7^{m}0), from a white iron framework structure; the rear light is exhibited, at an elevation of 151 feet (46^{m}0), from a white iron framework structure, but black on its northern face, 23 feet (7^{m}0) in height, situated about 2¼ cables northward of the front light; these lights in line bear about 009°.

A light is exhibited, at an elevation of 33 feet (10^{m}1), from a white iron framework structure, 36 feet (11^{m}0) in height, with white screens on either side, situated on the south-eastern side of Anak Soewangi. This light in line with the rear light described above, bears 212°.

A pile beacon, situated about 4½ cables south-eastward of Soewangi front light, marks the edge of the bank on the eastern side of the fairway.

A black can buoy is moored about 4 cables south-eastward of Anak Soewangi light-structure, and marks the western side of the fairway; a black beacon, surmounted by a cone, stands close north-westward of this buoy. A black light-buoy, exhibiting a *red fixed* light, is moored about 5½ cables east-north-eastward of Anak Soewangi light-structure.

A white can buoy is moored 5¾ cables north-eastward of Anak Soewangi light-structure (*Lat. 3° 27′ S., Long. 116° 02′ E.*); a white beacon surmounted by a ball, stands close northward of this buoy.

A light is exhibited from a black beacon on the western side of the main channel, about 4¾ cables north-eastward of the northern extremity of Anak Soewangi.

Charts 3017, 2637, 1066, 941b, 1263, 2759a.

Chart 3021, plan of Laut strait.

A black beacon, surmounted by a cone, stands on the southern part of Gusong Pajoeng; a black mooring buoy is situated on the eastern side of this bank.

Northern entrance to Straat Laoet.—Light.—Buoy.—Close northward of Gusong Pajoeng the strait trends in a north-easterly direction, and is clear of dangers in the fairway. Tanjong Langadei, on the north-western side of the strait and about 5½ miles north-eastward of the mouth of Sungei Troesan, is low and thickly wooded. Between Tanjong Langadei and Tanjong Dewa, about 9½ miles north-eastward, is a bay entirely occupied by a mudbank which partly dries; the 5-fathom (9ᵐ1) line of the outer edge of this bank lies nearly 5 miles south-south-eastward of Tanjong Dewa. *See* view facing this page.

The roadsteads of Setagin and Kota Baroe lie on the south-eastern side of the northern entrance to Straat Laoet, between Tanjong Ajoen and Tanjong Kemoening.

A light is exhibited, at an elevation of 217 feet (66ᵐ1), from a white iron framework structure, 66 feet (20ᵐ1) in height, on Balingkar, a hill, situated about 1¾ miles south-westward of Tanjong Kemoening.

A black can buoy, surmounted by a cone, is moored off the northern entrance to Straat Laoet, about 9 cables north-north-eastward of Tanjong Kemoening. Vessels should pass northward of this buoy.

Reede Setagin.—Setagin, where the Government coal depôt was formerly situated, stands about 2¾ miles north-eastward of Tanjong Ajoen, and between the two Setagin rivulets. There are two piers, the south-western of which has a T-head, with depths of from 12 to 20 feet (3ᵐ7 to 6ᵐ1) alongside. In 1948 the north-eastern pier was not serviceable.

The coal mines, which formerly existed at Semblinbingang, are now closed.

Kota Baroe.—Light.—Kota Baroe (Baru) (*Lat. 3° 14′ S., Long. 116° 14′ E.*), about 5 miles north-eastward of Setagin, is a prosperous village with Chinese and native bazaars, and is the residence of a Government official. A pier extends into a sufficient depth to make landing practicable at all times. Provisions and drinking water are obtainable; there is a harbour doctor and a hospital. Kota Baroe is visited by vessels of the Koninklijke Paketvaart Maatschappij, and there is telegraphic communication with Bandjermasin.

A light is exhibited, at an elevation of 36 feet (11ᵐ0), from a mast on the head of the pier at Kota Baroe.

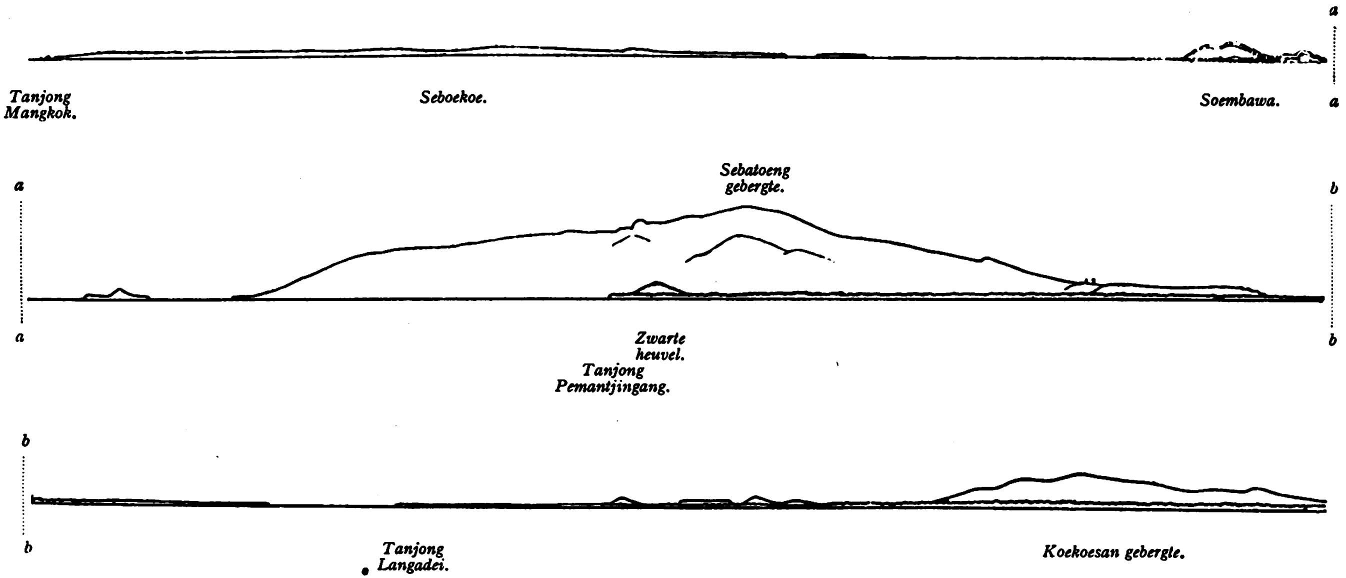
The roadstead is bounded by a line drawn in a 337½° direction from Balingkar light-structure to the Borneo coast, and by a line drawn in a 287° direction, to the Borneo coast, from the mouth of Sungei Tramoean (Tramuan), situated about 1½ miles south-westward of Balingkar light-structure.

The best anchorage is about 2 cables off the pier. With winds blowing in the direction of the strait there may be some sea in the roadstead, but this subsides with the land breeze. As a rule, there is fair weather in the morning, whilst towards noon frequent short rain squalls may be expected; this is the case throughout the year.

Tidal streams in Straat Laoet.—The tidal streams set northward or southward, but the in-going and out-going streams are quite indefinite, and it is impossible to predict the direction of the tidal stream

Charts 3014, 2637, 941b, 1263, 2759a.

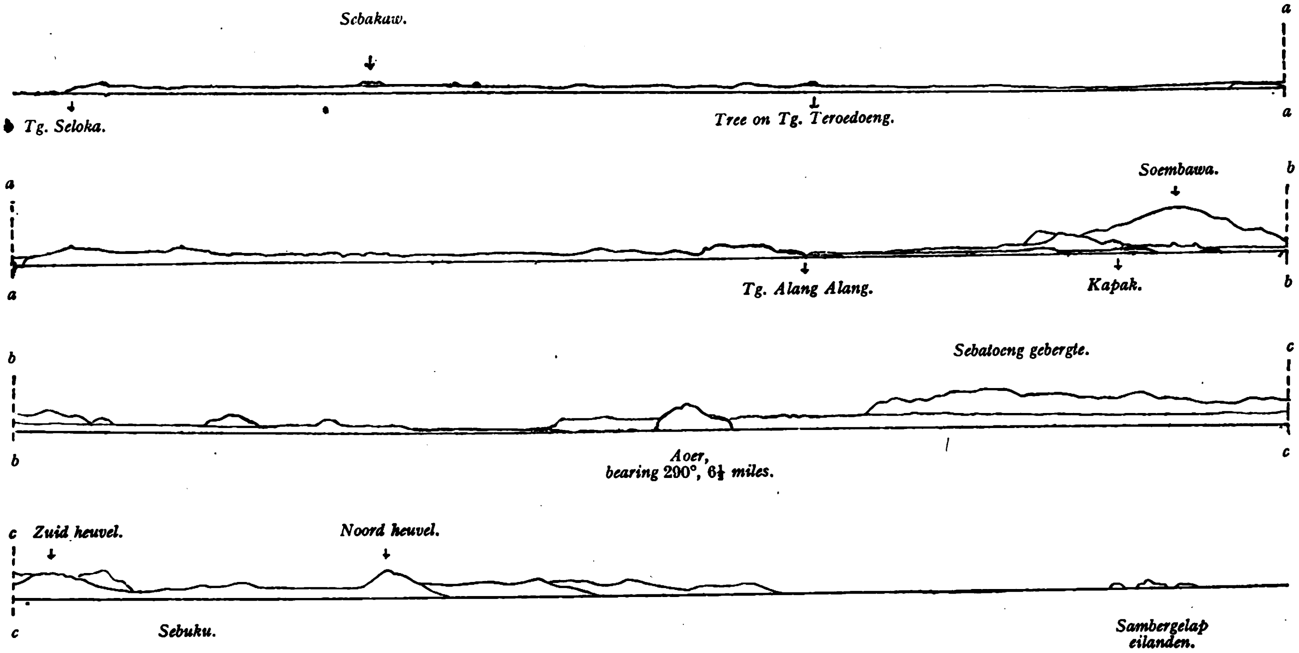
To face page 386.



View, in three parts, of northern entrance of Straat Laoet.

(*Original dated* 1947.)

To face page 387.



View, in four parts, of east coast of Pulau Laoet.
(*Original dated* 1931.)

Chart 3021, plan of Laut strait.

beforehand; as a rule, the maximum rate, from 1½ to 2½ knots, seems to occur shortly after the changes in the vertical movement of the water. It often happens that the direction of the tidal stream in the northern part of the strait is contrary to that in the southern part.

Chart 3021, plans of Laut strait and Channel east of Suwangi.

Directions for Straat Laoet.—A vessel approaching Straat Laoet from southward will soon sight Djambangan, and should steer for the light-structure on Tanjong Petang when sighted, bearing 026°, which leads westward of the sandbanks off the entrance in a least depth of 23 feet ($7^{m}0$). When she is about one mile off Tanjong Petang light-structure, she should steer so as to pass between this point and the conical buoy with reflector, southward of the point; then she should keep about 3 cables off the western side of the strait until about one mile north-eastward of Tanjong Petang, when she should alter course north-eastward, with the northernmost of the Palo Palo heuvels, which has a very noticeable peak, bearing 033°. As soon as the light-structures on Soewangi are in line, bearing 009°, she should keep on this alignment, which leads eastward of the two black can buoys marking Bank van Kramat. There is also a clear channel westward of this bank, but it is very narrow at its southern end, opposite the mouth of Sungei Pegatan, and there is frequently a confused current here.

The channel eastward of Soewangi should be navigated by eye, passing about midway between the south-eastern side of Soewangi and the pile beacon about 4 cables south-eastward, thence close south-eastward of the white conical buoy about 4 cables south-eastward of Anak Soewangi light-structure, thence eastward and northward of the black light-buoy and westward of the white conical buoy, situated 5½ cables east-north-eastward and 6 cables north-eastward, respectively, of the same light-structure, thence westward of the black light-beacon. The white conical buoy south-eastward of Anak Soewangi should be passed close-to, as a 17-foot ($5^{m}2$) patch lies about one cable south-eastward of it. The channel between the shoals eastward and north-eastward of Anak Soewangi is narrow and tortuous, and has a least depth of 15 feet ($4^{m}6$) in the fairway.

Thence the vessel should bring the light-structure on Anak Soewangi in line astern with the high light-structure on Soewangi, bearing 212°; the least depth on this alignment is 17 feet ($5^{m}2$); the vessel should keep on this alignment passing eastward of the black beacon on the southern extremity of Gusong Pajoeng, until she is abreast of the mouth of Sungei Sambaloean (Sambaluan), situated about 2½ miles southward of Tanjong Ajoen, when she should steer 016°, which leads through the channel eastward of this shoal, passing eastward of the black mooring buoy. After passing Tanjong Ajoen (*Lat. 3° 18′ S., Long. 116° 07′ E.*) she may alter course north-eastward and steer through the fairway, passing northward of the black can buoy off the northern end of Pulau Laoet.

Sebatoeng gebergte is a good mark for a vessel approaching Straat Laoet from northward. There is frequently a strong and confused current off the northern end of Pulau Laoet. When approaching Tanjong Ajoen care should be taken not to mistake that point, as in hazy weather vessels have been known to alter course southward too early and run on to the mud bank off the mouth of Sungei Sawil. The light-structures on Soewangi and Anak Soewangi are plainly visible by

Charts 3017, 3014, 2637, 941b, 1263, 2759a.

Chart 3021, plans of Laut strait and Channel east of Suwangi.

day. For the remainder of the strait, the directions previously given for vessels from southward should be followed in the reverse order.

Chart 2637.

OUTLYING ISLANDS AND DANGERS.—Lima eilanden.—Lima eilanden, about 80 miles south-eastward of the southern extremity of Pulau Laoet, consist of five low islands mostly covered with coconut trees, lying near the edge of the 100-fathom ($182^{m}9$) line on the western side of Macassar strait. Sabaroe (Sibaru), the largest and southernmost of the group, and Masalima, the westernmost, can generally be seen from a distance of about 15 miles owing to the high trees on them. Each island is surrounded by a reef, and there is usually a raised ridge of stones on the outer edge, which makes landing difficult; there are deep passages between the islands, and the current is generally strong and variable, sometimes attaining a rate of 2½ knots.

Aurora bank, with a depth of 4¼ fathoms ($7^{m}8$) over it, lies about 22 miles south-south-westward of Sabaroe, and there are several shoal patches between; the northernmost of these, named Trinidad, lies about 2 miles southward of Sabaroe, and has a least depth of 2¾ fathoms ($5^{m}0$) over it. Several patches, with depths of not less than 6 fathoms ($11^{m}0$) over them, lie about 12 miles westward of Lima eilanden.

Laurel riffen, or Batoe Boentoenga, extend for about 40 miles northward of Masalima, a few miles within the 100-fathom ($182^{m}9$) line; they are steep-to on the eastern side, and the least depth over them is 2 fathoms ($3^{m}7$); those with a depth of 5 fathoms ($9^{m}1$) over them and less are marked by discoloration. Martaban bank, about 52 miles northward of Masalima, has a depth of 6 fathoms ($11^{m}0$) over it.

Directions.—The usual route through Macassar strait lies so far westward of Lima eilanden that they are not even sighted. Vessels crossing the strait from east to west, or *vice versa*, in approximately this latitude are advised to pass between Lima eilanden, the passage along the northern side of Sabaroe being preferable, as it is fully one mile wide between the reefs extending from this island and Masalima (*Lat. 5° 03′ S., Long. 117° 03′ E.*); the current sets in the direction of the channel, and may attain a rate of 2½ knots. The north-western side of Pamolikang in line with the southern extremity of Masalima, bearing 074°, leads between two 6-fathom ($11^{m}0$) patches lying about 10 miles westward of Sabaroe.

Islets and dangers between Martaban bank and Kleine Paternoster eilanden.—Lari Larian, about 46 miles north-eastward of Martaban bank, is a low islet covered with shrubs; the surrounding reef extends a considerable distance from the northern side of the islet. There is good anchorage on the western side, in a depth of 7 or 8 fathoms ($12^{m}8$ or $14^{m}6$). A reef, with a depth of 3¼ fathoms ($5^{m}9$) over it, lies about 10 miles south-westward of Lari Larian, and is not easily seen; about 5½ miles eastward of this reef is a 4¾-fathom ($8^{m}7$) patch, plainly marked by discoloration.

Taka Talloe (Tallu), about 30 miles north-north-eastward of Lari Larian, is a small sandy cay, always above water, and subject to continual alteration according to the prevailing monsoon; at the lowest level of low water spring tides, in June and July, the cay is about

Charts 941b, 1263, 2759a.

Chart 2637.

10 feet (3^{m}0) above water, and is then about a quarter of a cable in length. It lies on a submerged reef, and can usually be seen from a distance of about 5 miles at low water. Two coral patches, with depths of 6½ fathoms (11^{m}9) and 6 fathoms (11^{m}0) over them, lie about 8 miles east-north-eastward and 11 miles north-north-eastward, respectively, of Taka Talloe. There is good anchorage in the vicinity of Taka Talloe.

Loemoe Loemoe (Lumu Lumu), about 12 miles north-westward of Taka Talloe, is a low islet covered with shrubs, and is visible 6 miles in clear weather; on the north-western side of the surrounding reef is a basin, suitable for small vessels. In April, May, and June the islet is visited by natives from Mandar, in Celebes, for edible seaweed.

In the area between Martaban bank and Kleine Paternoster eilanden, the direction of the current is governed by the prevailing wind; the tidal streams are weak. In the North-west monsoon the current is southerly and during the South-east monsoon it is north-westerly. The greatest rate observed was 1½ knots.

Chart 3014.

A coral reef, with a depth of 3 feet (0^{m}9) over it, lies nearly 30 miles westward of Loemoe Loemoe; it is not marked by either surf or discoloration.

Kleine Paternoster eilanden are described on page 395, and the passage between these islands and the Borneo coast on page 394.

Charts 3017, 3021.

WESTERN SIDE OF MACASSAR STRAIT.—**Eastern side of Laoet.**—Tanjong Lajar, the southern extremity of Laoet, is low and thickly wooded; there is a bay with shallow depths between this point and Koenjit (page 382). A shoal, with a depth of 13 feet (4^{m}0) over it, lies about 2 miles north-north-eastward of Tanjong Lajar. Some islets and rocks lie close to the coast at the foot of Sebakaw hill, and thence there is a sandy beach to Tanjong Sarang Djanak (Janak), a low, wooded point about 9 miles north-eastward of Tanjong Lajar. *See* view facing page 387.

Karampoetan (Karamputan), 4½ miles north-eastward of Tanjong Lajar and about 1½ miles offshore, has three small peaks, the south-western being the lowest, and the north-eastern the highest; it is fringed by a coral reef, which projects about 4 cables from its north-western side.

Chart 3017.

Kerisian, about 1½ miles north-eastward of Karampoetan and 2 miles offshore, has a conical peak with a tree on the top, visible from all sides. Vessels cannot pass between these two islands and the coast as they lie on the coastal bank.

Between Tanjong Sarang Djanak and Tanjong Seloka (*Lat. 3' 55' S., Long. 116° 18' E.*), 7 miles north-eastward, the coast forms two bights; a small river flows into the north-eastern bight, but the mouth is difficult to identify, as the drying coastal reef in the locality extends about 6 cables offshore. Tanjong Seloka is rocky and thickly wooded, and can be identified from a great distance by two round-topped trees on it, standing at an elevation of about 250 feet (76^{m}2).

Off-lying islands.—Karajaän (Karayaän), 3 miles southward of Kerisian, has a broad flat summit in the middle. There is a high, round-topped tree, very noticeable from northward or southward, on

Chart 3017.

its north-western extremity and there is a slender round-topped tree on its southern extremity; a small islet lying on the reef extending about one mile westward from the island is covered with casuarina trees. There is a narrow sandy beach on the northern and western sides of the island. The hill, 616 feet ($187^{m}8$) high, situated about 2¾ miles north-north-eastward of Sebakaw hill, in line with the western extremity of Karampoetan, bearing 002°, leads 1½ miles westward of the reef extending from Karajaän. The passage northward of Karajaän is clear of dangers.

Knoop eiland or Anak Karajaän (Karayaän), about 2 miles eastward of Karajaän, is a large rock covered with vegetation, and there is a round-topped tree, about 100 feet ($30^{m}5$) high, on the northern side; a rock, which dries, lies half a cable off the south-western side of the islet.

Coast.—About 3½ miles northward of Tanjong Seloka is the southern entrance point of a shallow bay, with an unnamed island lying in the southern part; Tanjong Teroedoeng (Terudung), the northern extremity of this island, appears as a separate islet from a distance, with a clump of dead trees southward of it. Balik is an islet on the coastal reef extending about 6 cables from the northern entrance point of the bay.

Tanjong Alang Alang, 3½ miles north-north-eastward of Balik, has a noticeable hill on it, 199 feet ($60^{m}7$) high; Kapak, about one mile northward of Tanjong Alang Alang and on the southern side of the entrance to Straat Seboekoe, is a low islet on a sandbank.

Charts 3017, 3014.

Straat Seboekoe (Sebuku), separating Seboekoe from Laoet, is too much encumbered with shoals to be of any importance to shipping, and there are several reefs in the southern part; Manti, in the northern entrance and about 3½ miles westward of Tanjong Mangkok, the north-eastern extremity of Seboekoe, is a small islet covered with coconut trees.

Seboekoe (Sebuku) is a thickly wooded, hilly island; Saoe (Sau), a hill, 675 feet ($205^{m}7$) high, on the east coast, and Zuid heuvel (South hill), 455 feet ($138^{m}7$) high, near the southern end of the island, are noticeable. Aoer (Aur), about one mile southward of the southern extremity of Seboekoe, is a conical, thickly wooded islet. There is a noticeable tree on a hill near Tanjong Mangkok; this point has a small wood on it, with one tree projecting above the others. *See* view on chart 3017.

Gosong Mangkok, a reef which dries, lies about 1½ miles north-north-westward of Tanjong Mangkok.

Off-lying islands.—Light.—Sambergelap eilanden, 13½ miles eastward of the southern extremity of Seboekoe, lie together on a reef which partly dries, and steep-to on the western side; a tree, conspicuous from the north-westward or south-westward, stands on the south-western parts of the largest of the group. The passage westward of the Sambergelap eilanden is safe, but that eastward of them is not recommended as a 6-fathom ($11^{m}0$) patch, with no trace of discoloration, was found about 9 miles eastward of the light-structure, and there may possibly be other shoals.

A light (*Lat. 3° 39′ S., Long. 116° 36′ E.*) is exhibited, at an elevation of 66 feet ($20^{m}1$), from a white iron framework structure, 46 feet ($14^{m}0$) in height, on the western side of the largest island.

Charts 2637, 941b, 1263, 2759a.

Charts 3017, 3014.

Off-lying danger.—A shoal, with depths of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$) over it, was reported, in 1945, to lie about 25 miles east-north-eastward of the northern extremity of Seboekoe; it was not examined.

Chart 3014.

Coast.—The east coast of Borneo, between Tanjong Dewa (page 386) and Tanjong Aroe (Aru), about 60 miles north-north-eastward, is low, marshy, and monotonously covered with vegetation. Kloempang (Klumpang) baai and Pamoekan (Pamukan) baai, in this part of the coast, are the estuaries of several rivers. Several dangers lie within the 5-fathom ($9^{m}1$) line, and the ooze-laden water from the rivers causes a turbulent and turbid sea for some miles offshore, so that reefs can seldom be sighted by any change in the colour of the water; vessels should, therefore, keep within depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$), passing westward of Addington reef (page 392).

There are few prominent landmarks, except for some hills not far from the coast between Kloempang baai and Pamoekan baai.

Currents.—When navigating along the coast between Pulau Laoet and Kleine Paternoster eilanden attention should be paid to the currents, as, owing to the numerous river mouths, there is sometimes a strong set inshore. The current is too irregular for reliable information to be given as to which direction it may be expected to set, but the following details were obtained during the survey:—

Within 10 or 12 miles of the coast between Tanjong Dewa and Tanjong Aroe, during the month of May, the north-going current predominated in the proportion of two to one; the direction varied between north and north-west, and the rate in any direction never exceeded 0·7 knot.

In July the north-going current predominated in the proportion of four to one, the direction being between north and north-east. The maximum rate of the north-going current was 1·7 knots, and that of the south-going 1·6 knots; the mean rate for both was half a knot.

During the first half of August the direction of the current alternated between north-east and south-west, with the same maximum rate as in July, decreasing to 0·7 knot during the second half of the month. For half the number of observations taken there was no current at all, and the south-east-going current gradually predominated.

During the first part of September the south-east-going current predominated, later on the prevailing direction, in the proportion of two to one, was south-south-east and south; the maximum rate increased to one knot.

Chart 3031, plan of Klumpang bay.

Kloempang baai.—Kloempang baai is entered between Tanjong Dewa and Tanjong Berlajar (Berlayar), 7½ miles northward; outside the line joining these two points is a flat, with a least depth of 3¼ fathoms ($5^{m}9$) in the fairway, which must be crossed before entering the bay. Within the entrance points there is a comparatively deep channel about 10 miles in length, running between the mudbanks on either side; the bottom over the inner part is mud and sand, outside it is mixed with stones.

On Tanjong Dewa (*Lat. 3° 08′ S., Long. 116° 16′ E.*) a hill rises to an elevation of 239 feet ($72^{m}8$). The three islands Nangka kechil, Nangka besar, and Taboean (Tabuan) lie within 3¾ miles northward of Tanjong

Charts 2637, 941b, 1263, 2759a.

Chart 3031, plan of Klumpang bay.

Dewa, Taboean being nearly in the middle of the entrance; there are coal mines on Nangka besar. The little islet of Boeroeng (Burung) lies on the coastal bank about 1¼ miles north-westward of Nangka kechil. A rock, which dries, lies about 7 cables northward of Taboean, with a similar rock about midway between.

Gosong Karbau, a group of rocks, which dry, lies about 1¾ miles south-eastward of Tanjong Berlajar, and another rock, which dries, lies about 1½ miles southward of the same point; all these rocks lie on the bank, with depths of less than 3 fathoms ($5^{m}5$), extending a considerable distance southward and south-eastward from Tanjong Berlajar. Two small patches, with depths of 2 and 3 fathoms ($3^{m}7$ and $5^{m}5$) over them, respectively, lie outside this bank and southward of Tanjong Berlajar, thus considerably narrowing the channel between the bank and the drying rock northward of Taboean.

About 3½ miles westward of Tanjong Berlajar is Tanjong Batoe (Batu), close south-eastward of which is Batoe (Batu) village, in which a native prince resides. A rock, which dries, lies on the edge of the drying coastal bank about half a mile south-eastward of the village, and a reef, with a depth of 6 feet ($1^{m}8$) over it, lies about 2 cables south-westward of Tanjong Batoe (*Lat. 3° 00′ S., Long. 116° 13′ E.*).

Sungei Serdang Koening (Kuning) and Sungei Troesan (Trusan) discharge into the western side of the bay, southward of Tanjong Gersik Hitam, situated about 2¼ miles westward of Tanjong Batoe. Sungei Bangkaälan and Sungei Tjantoeng (Chantung) discharge into the head of the bay.

Directions.—The deepest channel for entering Kloempang baai lies between Nangka besar and Taboean, but it is very narrow, and there is nearly always a current with a rate of from 1½ to 2 knots, especially after heavy rains. Vessels are, therefore, advised to use the passage between the drying rock about 7 cables northward of Taboean and the 3-fathom ($5^{m}5$) patch about half a mile farther northward; the least depth on this route is 3¼ fathoms ($5^{m}9$). There are no suitable marks for entering the bay, and the shoals are not marked by discoloration.

Chart 3014.

Off-lying reef.—Beacon.—Addington reef, about 39 miles north-eastward of Tanjong Dewa, consists of dark coral and stones, with a least depth of 3 feet ($0^{m}9$) over it, and from 15 to 19 fathoms ($27^{m}4$ to $34^{m}7$) around; it is not marked by discoloration, and only in a very calm sea, and at a short distance, is the position indicated by slight ripples.

A white beacon, surmounted by a ball, stands on the reef; in clear weather this beacon can be seen from a distance of about 10 miles.

Pamoekan baai.—Pamoekan (Pamukan) baai, the broad estuary of several rivers, is entered about 28 miles north-north-eastward of Tanjong Berlajar, and is about 4 miles wide at its entrance, but the navigable width is greatly reduced by a number of shoals consisting of stones, sand, and mud, lying off the entrance, and a wide bank extending south-eastward from either entrance point. Samalantakan village is situated on the western entrance point of the same name, and there is a prominent white Custom hut on the extremity of this point. Between Tanjong Pamoekan (Pamukan), the eastern entrance point, and Tanjong Sapada kechil, nearly 4 miles north-eastward, part

Charts 2637, 941b, 1263, 2759a.

Chart 3014.

of the coast is steep and covered with high trees; as the elevation to the tops of the trees is about 200 feet (61^{m}0), this portion of the coast can be seen from a considerable distance, and appears as an island. Tanjong Merah, midway between these two points, can be identified by its reddish colour.

The shores of the bay and the banks of the rivers are low and covered with mangroves, except for a small rocky portion on the southern shore, opposite Parak (*Lat. 2° 34′ S., Long. 116° 22′ E.*), an islet nearly midway between Samalantakan village and Tanjong Kersik Hitam, situated 4 miles west-north-westward. Sungei Sampanahang and Sungei Menoengoel (Menungul) flow out at the head of the bay, and Sungei Serama and Sungei Tjengal (Chengal) on the northern side. Goenoeng Batoe (Gunong Batu) Besar, a coal mining settlement, is situated on the right bank of Sungei Sampanahang, about 5 miles above the mouth; there is a pier here, with a depth of 16 feet (4^{m}9) alongside. In 1947, there was a small bank, which dries, at the north-eastern extremity of the pier.

The current in Sungei Sampanahang may attain a rate of 2½ knots.

There is a depth of about 2½ fathoms (4^{m}6) on the bar off the entrance to Pamoekan baai, and this depth can be carried at all times through the channel inside the bay between the extensive mudbanks on either side.

Dangers.—Beacons.—Buoyage.—The approach to Pamoekan baai is marked by a light-buoy, painted white, exhibiting a *white flashing* light of *three seconds* duration *every twelve seconds*, moored about 5 miles south-eastward of Tanjong Pamoekan.

The edge of the bank on the southern side of the channel is marked by a black conical beacon, situated about 2 miles southward of Tanjong Pamoekan. A shoal, with a depth of 8 feet (2^{m}4) over it, lies about 1½ miles northward of Tanjong Samalantakan, and is marked by a black beacon, surmounted by a cone. A shoal, with a depth of 5 feet (1^{m}5) over it, lies close southward of this beacon, and a rock, which dries, lies near the edge of the bank extending from the northern shore, about 4 miles north-westward of Tanjong Pamoekan.

Two shoals, each having a depth of 5 feet (1^{m}5) over it, lie nearly 1¼ miles eastward of Tanjong Kersik Hitam; the southern shoal is marked by a black cone beacon, and the northern by a white ball beacon. A shoal, with a depth of 3 feet (0^{m}9) over it, lies about 6 cables north-eastward of Tanjong Kersik Hitam, and is marked by a white ball beacon.

Directions.—The channel in Pamoekan baai affords no difficulty if the beacons and buoys are in place, but in 1947, some of them were reported to be missing. A depth of 15½ feet (4^{m}8) can be carried through the channel, but attention should be paid to the tidal streams, which set across the channel outside the entrance; their maximum rate inside the bay is 1½ knots.

A vessel entering should pass close southward of the white fairway light-buoy, thence north-eastward of the black cone beacon southward of Tanjong Pamoekan. If bound for Goenoeng Batoe Besar she should pass northward of two black cone beacons and southward of two white ball beacons, and should thence round Tanjong Kersik Hitam at a distance of about 1½ cables and proceed to the anchorage off the pier, where there is a depth of about 5 fathoms (9^{m}1).

Charts 2637, 941b, 1263, 2759a.

Chart 3014.

If bound for Samalantakan the vessel should follow the directions given above until the flagstaff on Tanjong Samalantakan bears 249°, when she should steer for it on that bearing. Anchorage may be obtained with the flagstaff bearing 230° and the black cone beacon northward of the point, 001°, about 1½ cables offshore. There is often a strong tidal stream here and onshore winds raise a choppy sea.

Passage between Borneo and Kleine Paternoster eilanden.—Lights.—Dangers.—Beacons.—The passage bounded on the west by the Borneo coast between Tanjong Sapada kechil (*Lat. 2° 32′ S., Long. 116° 32′ E.*) and Tanjong Aroe (Aru), about 22 miles northward, and on the east by the meridian of 117°*E.*, which may be considered as the western limit of Kleine Paternoster eilanden, is encumbered by the following banks and reefs:—

Cora reef, with a least depth of 4 fathoms ($7^{m}3$) over it, is the southernmost danger, and lies about 21 miles eastward of Tanjong Sapada kechil. Blenheim reefs, almost a continuation northward of Cora reef, consist of several shoal patches with deep water between; the shoalest part, in about the middle, is nearly awash. A bank of coral, with a least depth of 5 fathoms ($9^{m}1$), over it, sometimes marked by discoloration, lies about 17 miles east-north-eastward of Tanjong Sapada kechil. Hercules rif, 15½ miles north-eastward of Tanjong Sapada kechil, and 9½ miles offshore, is of coral, sand and stones; a part of it is always above water.

A light is exhibited, at an elevation of 39 feet ($11^{m}9$), from a black beacon, 30 feet ($9^{m}1$) in height, on Hercules rif.

Riouw (Riau) riffen, consisting of three reefs, lie within the 3-fathom ($5^{m}5$) line about 3 miles offshore, from about 6 to 12 miles northward of Tanjong Sapada kechil, and are not marked by discoloration.

A 5-fathom ($9^{m}1$) patch, reported in 1944, lies about 5 miles east-south-eastward of Hercules light-beacon. Anna reefs, about 12 miles east-south-eastward of Hercules light-beacon, are two coral heads, which dry, with a depth of 22 feet ($6^{m}7$) between them. Cecil reefs, about 10 miles eastward of the same light-beacon, consist of a patch, which dries, and several shoal heads. Two shoals, the positions of which are approximate, were reported, in 1945, to lie about 2 and 3½ miles eastward of the northern of Anna reefs.

September reef, about 7½ miles north-eastward of Hercules rif light-beacon, consists of coral, sand, and stones, and there is a small patch, which dries, in about the middle. A 39-foot ($11^{m}9$) patch lies about 3¾ miles southward of the drying patch of September reef. A black conical buoy is moored about 6 cables south-westward of the drying patch.

Aroe (Aru) bank, about 6½ miles south-eastward of Tanjong Aroe and about 4¼ miles offshore, consists of three detached reefs of coral and stones, which dry, covered with mud and sand; there is a depth of 3¼ fathoms ($5^{m}9$) in the channel between the two southern reefs. Two 3-fathom ($5^{m}5$) patches lie about one mile northward of Aroe bank.

A light is exhibited, at an elevation of 76 feet ($23^{m}2$), from a white iron tower on piles, situated on the north-western edge of the south-eastern reef of Aroe bank. An unofficial white beacon surmounted by a ball stands close northward of the light-tower.

Vessels usually pass westward of Hercules rif and eastward of Aroe bank; small vessels with local knowledge can pass westward of

Charts 2637, 941b, 1263, 2759a.

Chart 3014.

the latter by sounding. A channel has been swept from a position about 3 miles eastward of Aroe bank, for about 12 miles northward.

The coast between Tanjong Sapada kechil (*Lat. 2° 32′ S., Long. 116° 32′ E.*) and Tanjong Aroe is monotonously wooded, and is fringed by a narrow sandy beach. The northern extremity of Tanjong Aroe consists of sand, covered with coconut trees.

Chart 2637.

KLEINE PATERNOSTER EILANDEN.—Kleine Paternoster eilanden lie within the area bounded on the west by the meridian of 117° E., on the south by the parallel of 2° 50′ S., on the north by the parallel of 2° 00′ S., and on the north-east by the 100-fathom ($182^{m}9$) line. The general formation of these islands is a foundation of coral and a stratum of coral sand thrown up from the sea, followed by driftwood and vegetable débris, aided by deposits of numerous sea birds; grass, creeping plants, and brushwood gradually appear, and finally, on the larger islands, are trees, some nearly 200 feet ($61^{m}0$) high and visible in clear weather about 16 miles. The islands are not permanently inhabited, but they are visited by fishermen from both Borneo and Celebes, who remain for a few months at a time.

Along the north-eastern side of the bank on which the group lies is a chain of reefs, drying in many places, and containing a few islands; on the north-eastern side these reefs rise very steeply from depths of over 100 fathoms ($182^{m}9$) whilst within this narrow ridge there are general depths of under 30 fathoms ($54^{m}9$).

Chart 3014.

Western group.—The western part of Kleine Paternoster group consists of an area about 30 miles long in a north and south direction, and 15 miles wide, encumbered with banks and reefs; most of the latter dry, and a few are always above water. Oenarang (Unarang), a reef, about 20 miles east-south-eastward of Hercules rif and the south-western of this group, is nearly always above water.

Sangai, about 15 miles northward of Oenarang, is partly covered with brushwood, and has one small tree on it, visible about 8 miles.

Chart 2637.

North-eastern group.—Light.—Amboengi (Ambungi), a reef, about 12 miles north-eastward of Sangai, is partly above water, and lies near the north-western end of this group, which thence runs in a south-easterly direction for about 65 miles.

Sebangkatan, about 12 miles south-eastward of Amboengi, is thickly wooded with coconut trees, and is generally visible about 13 miles. South-eastward of this island there is a gap, about 8 miles wide, in the chain of reefs lying just within the 100-fathom ($182^{m}9$) line.

Setoerian (Seturian), about 15 miles eastward of Sebangkatan, is thickly wooded and, in 1928, had four tall trees, about twice the height of the others and very noticeable, at the western end of the island.

Kabala Doea (Dua), about 20 miles south-eastward of Setoerian, lies on the north-western part of a reef, which partly dries, about 3½ miles long, and is partly covered with grass and brushwood; two small sand cays, always above water, lie on the south-eastern part of the reef.

Balabalagan or Ambo, 3½ miles south-eastward of Kabala Doea,

Charts 941b, 1263, 2759a.

Chart 2637.

is a wooded island, and there is a very tall tree both eastward and westward of the light-structure; the passage between these two islands is unsafe.

A light (*Lat. 2° 32′ S., Long. 117° 57′ E.*) is exhibited, at an elevation of 141 feet (43^{m}0), from a white iron framework structure, 131 feet (39^{m}9) in height, on the northern side of Balabalagan.

Djaitan (Jaitan), the south-easternmost of the drying reefs, lies close south-eastward of Balabalagan. A reef, with a depth of 3 feet (0^{m}9) over it, and deep water around, lies about 3¾ miles westward of Balabalagan.

Semarang shoal, at the south-eastern end of the raised ridge just within the 100-fathom (182^{m}9) line, and about 14 miles south-eastward of Balabalagan, has a depth of 3¼ fathoms (5^{m}9) over it; a narrow ridge, with a least depth of 4¾ fathoms (8^{m}7) over it, extends about 7 miles north-westward from this shoal.

A bank, with a depth of 12 fathoms (21^{m}9) over it, was reported, in 1949, to lie about 15 miles south-eastward of the light-structure on Balabalagan.

Southern group.—Within the western and north-eastern groups of Kleine Paternoster eilanden is an inner group of islands, the principal islands of which are:—

Salingsingan, situated about 7 miles south-eastward of Sangai, is the north-western island of the inner group; a reef, with a small portion of it always above water, lies about 2¼ miles northward of Salingsingan. Kamarian besar and Kamarian kechil are two small islets lying on a bank about 3 miles south-eastward of Salingsingan; Kamarian besar is covered with high trees, and Kamarian kechil is little more than a sand cay, with creeping plants and one small tree. Sabojan (Saboyan), about 3 miles eastward of Kamarian besar, has a clump of trees, about 180 feet (54^{m}9) high, on its northern extremity. Samataha, about 5½ miles southward of Sabojan, is a wooded islet visible about 16 miles. Poöng Poöng, 3 miles eastward of Samataha, is also wooded. Semanga besar, about 2 miles north-eastward of Poöng Poöng, is wooded, and has a tall tree projecting above the others. Semanga kechil, about one mile farther north-eastward, is low, with one small tree on it. Lamoedaän (Lamudaän) besar, 5 miles eastward of Semanga besar, is covered with tall dark trees; Lamoedaän kechil, half a mile farther eastward, is also wooded. Melambir, 3½ miles eastward of Lamoedaän kechil, is thickly wooded, with one tall tree in its centre which may be seen from a distance of about 16 miles. Pinaät, about 2¾ miles north-eastward of Melambir, may be identified by a large crown-topped tree. Seloang, the easternmost island of the inner group, lies about 4 miles east-south-eastward of Pinaät, and has some high trees in the southern part. Byron rif, which is covered with low bushes, lies about 11 miles south-eastward of Seloang, and nearly midway between is an isolated reef nearly awash.

Directions.—No vessel should venture amongst Kleine Paternoster eilanden without local knowledge; even then the greatest caution is necessary to avoid the known dangers, whilst there is always the possibility that others may exist.

Vessels proceeding through the islands from south-westward should steer for the high trees on Samataha on a north-easterly bearing,

Charts 941b, 1263, 2759a.

Chart 2637.

thence passing about 2 miles north-westward of that island and about one mile south-eastward of Sabojan, and thence out by the wide passage south-eastward of Sebangkatan.

From eastward, the passage, 3 miles wide, north-westward of Kabala Doea, may be used, but care should be taken to avoid the isolated reef, nearly awash, lying about 9 miles westward of Kabala Doea; the trees on the southern part of Seloang, and the light-structure (*Lat.* 2° 32′ *S.*, *Long.* 117° 57′ *E.*) on Balabalagan are useful landmarks. The passage between Semarang and Balabalagan should never be used, as there are no suitable marks for fixing the vessel's position.

From north-eastward, the passage between Setoerian and the large reef, the greater part of which dries, about one mile north-westward, may be used; at half-tide a small sandbank near the eastern edge of this reef is still visible.

From northward, the wide passage south-eastward of Sebangkatan is safe, taking care that Lamoedaän besar does not bear more than 193°, so as to clear the reef on the eastern side of this entrance.

Vessels passing northward or eastward of Kleine Paternoster eilanden should give them a wide berth, owing to the prevailing southerly current outside the 100-fathom ($182^{m}9$) line.

Chart 3014.

WESTERN SIDE OF MACASSAR STRAIT (continued).—The Borneo coast between Tanjong Aroe (page 394), and Tanjong Giling, about 11 miles north-westward, is low, marshy, and wooded, and several rivers flow out; the bottom rises steeply within the 3-fathom ($5^{m}5$) line and almost dries in many parts. Tanjong Giling has a large, round-topped tree on it.

Telok Apar, immediately southward of Tanjong Giling, is the estuary of the largest river, but it is of no importance to shipping; in the rainy season so much water is discharged that an outset of more than 2 knots may be encountered between the 5-fathom and 10-fathom ($9^{m}1$ and $18^{m}3$) lines.

Sungei Pasir and approaches.—Dangers.—Beacons.—Buoy.—Sungei Pasir (Pasar) discharges between Tanjong Teriti, about 9½ miles north-north-westward of Tanjong Giling, and Tanjong Tai, about half a mile farther north-westward.

Several dangers lie in the south-eastern approach, of which Batu Meha, about 9 miles east-south-eastward of Tanjong Teriti, Karangan, and Palambu reefs, situated, respectively, about 7½ cables north-north-westward and about 2 miles west-north-westward of Batu Meha, partly dry. A black beacon, surmounted by a cone, stands on Karangan reef.

Anjir Sabon rif, which dries, extends about 2½ miles south-eastward from Tanjong Sabon, situated 6¼ miles northward of Tanjong Giling.

There is a bar of soft mud, with a least depth of 4 feet ($1^{m}2$) in the channel over it, off the entrance to the river, which is marked on its northern side, about 3¾ miles east-north-eastward of Tanjong Teriti, by an iron beacon surmounted by a ball, and on its southern side by two similar beacons. A mooring buoy, surmounted by a cone, is moored about 2 miles east-north-eastward of Tanjong Tai. The tidal streams are strong.

About 4 miles above the entrance the river divides into two branches;

Charts 2637, 941b, 1263, 2759a.

Chart 3014.

the northern of these continues under the name of Sungei Pasir, and the southern is named Sungei Balengkong; these branches unite again about 13 miles westward of Tanjong Teriti (*Lat. 1° 52′ S., Long. 116° 25′ E.*). Pasir Baroe (Baru), where the Sultan of the district resides, is situated about one mile above the junction; Tanahgrogot, a Buginese village with a brisk trade, is the shipping place for Pasir Baroe, and is situated on Sungei Pasir a few miles below its re-union with the Balengkong.

Reede Tanahgrogot is bounded by the parallels of the point formed by the junction of Sungei Serateh with Sungei Pasir, and of the roadstead boundary mark about 8 cables down stream.

Tanahgrogot is the headquarters of a Government official, and is visited occasionally by vessels of the Koninklijke Paketvaart Maatschappij; there is a landing pier here.

Vessels bound for Pasir Baroe should proceed through Sungei Pasir in preference to Sungei Balengkong, as, although the depths in the latter are more regular, it is much narrower, and the sharp bends and numerous embedded tree trunks render navigation impracticable except at high water, when the least depth is 13 feet (4^{m}0), for vessels not exceeding 160 feet (48^{m}8) in length. In Sungei Pasir the least depth at low water springs is 6½ feet (2^{m}0), in the stretch of the river between Tanahgrogot and Pasir Baroe; a gravel bank lies across the river about 2 miles below Tanahgrogot, and the channel across it, which runs close along the right bank, had a depth of 9 feet (2^{m}7) in 1924.

Adang baai.—Adang baai, entered between Tanjong Mandoe (Mandu), about 6½ miles north-north-eastward of Tanjong Tai, and Tanjong Telakai, about 10 miles farther in the same direction, is an estuary of several rivers, the principal of which are Pasir Lama, Lombok, and Adang; although the bay is open to easterly winds, which quickly raise a swell, vessels lie well sheltered under all conditions in the mouths of these three rivers. The shores of the bay are very low.

Pasir Majang, the most important village in the bay, is situated at the mouth of Sungei Pasir Lama, and can be reached at all times by vessels not exceeding a draught of 18 feet (5^{m}5); above this village the river is only navigable for native craft. Sungei Lombok and Sungei Adang can be entered by vessels of 16 feet (4^{m}9) and 11 feet (3^{m}4) draught, respectively, but a pilot should be employed.

Vessels entering the bay should pass at least 6 miles eastward and more than 2 miles northward of Tanjong Mandoe, owing to the large mudbank extending from it; thence gradually steer in, sounding continuously, until off the western entrance point of Sungei Raja (Raya), about 5½ miles westward of Tanjong Mandoe, when the southern shore of the bay may be followed at a distance of about 3 cables.

Coast.—Beacon.—The coast between Tanjong Telakai and Tanjong Djoemalai (Jumalai) (*Lat. 1° 21′ S., Long. 116° 45′ E.*), about 21 miles north-eastward, is low, marshy, and wooded. The 3-fathom (5^{m}5) line may be safely approached until near Tanjong Djoemalai, where detached coral reefs, which partly dry, extend 3½ miles southward from the point, the outer reef being marked by a black beacon, surmounted by a triangle.

Charts 2637, 941b, 1263, 2759a.

Chart 3014.

Piek van Balik Papan, about 33 miles north-westward of Tanjong Djoemalai, is cone-shaped when bearing more than 270°, but is less sharp when bearing less than 270°. Platte heuvel (Flat hill), about 6 miles south-westward of Piek van Balik Papan, is somewhat lower.

Charts 3031, plan of Balik Papan bay, 3014.

BALIK PAPAN BAAI AND APPROACHES.—Light.—Balik Papan baai, entered between Tanjong Djoemalai and a point about 5 miles north-north-eastward, is the deep and spacious estuary of several rivers, and extends inland for about 12 miles in a northerly direction to the mouth of Sungei Balik Papan ; about 5 miles farther northward this river divides into two branches, named Sungei Sepakoe (Sepaku) and Sungei Semoi. *See* view on chart 2636 and view facing page 416.

The land around the bay is generally low, with a few inconspicuous ridges of hills inland. The north-eastern entrance point of the bay, on which Balik Papan is situated, is hilly ; Tokong, a hill, 288 feet (87^{m}8) high, lies close to the sea on the northern side of this point, and is very prominent owing to its regular conical shape. A look-out tower stands on the summit of Tokong hill, and the harbour office is situated on the north-western slope.

A light is exhibited, at an elevation of 301 feet (91^{m}7), from a white dwelling, 13 feet (4^{m}0) in height, on Tokong hill.

Tokong eilandje lies about one cable offshore west-south-westward of Tokong light-structure. There are several islands farther up the bay, but most of them are mangrove swamps, although the larger ones have a hill in the middle. Three radio masts near the coast, about 2½ miles eastward of Tokong light-structure, are prominent.

Pilots.—Pilots for in-going vessels proceed outside the harbour in a motor boat. There is no pilotage between sunset and sunrise.

Swept channel.—Buoyage.—There is a swept channel leading to Reede Balik Papan from a position about 7½ miles south-eastward of Tokong light and, in 1948, had a least depth of 23 feet (7^{m}0). The outer end of the channel is marked on its southern side by a light-buoy, painted black, exhibiting a *white flashing* light *every five seconds*, and on the northern side by a white conical buoy, surmounted by a ball. A conical buoy, painted in black and red bands, surmounted by a ball, is moored about 1¼ miles southward of the outer light, described above.

The northern and eastern sides of the swept channel are marked thence towards the roadstead by a white can mooring buoy, surmounted by a cone, a light-buoy, painted white, exhibiting a *white flashing* light *every sixteen seconds*, a white conical buoy surmounted by a cone, a white can buoy, surmounted by a cylinder, and a white can buoy, surmounted by a cone the latter situated about 6 cables south-westward of Tokong light (*Lat. 1° 16′ S., Long. 116° 48′ E.*).

The southern and western sides of the channel are marked from the outer light-buoy towards the roadstead by a black can buoy, surmounted by a truncated cone, a black mooring buoy, a black can buoy, surmounted by a truncated cone, a black mooring buoy, and a light-buoy, No. 9, painted black with a red superstructure, exhibiting a *white flashing* light *every five seconds*, the latter situated nearly 1½ miles south-westward of Tokong light.

Charts 2637, 941b, 1263, 2759a.

Charts 3031, plan of Balik Papan bay, 3014.

In addition to the buoys marking the swept channel, a black spherical buoy is moored about 5 miles south-eastward of Tokong light.

Chart 3031, plan of Balik Papan bay.

Reede Balik Papan. — Dangers. — Buoys. — Beacons. —Reede Balik Papan is bounded by the parallels of Tokong eilandje (*Lat. 1° 16′ S., Long. 116° 48′ E.*) and Tanjong Penadjam (Penajam), about 2¼ miles north-westward.

A shoal, with a depth of 3 feet ($0^{m}9$) over it, lies about 1½ cables northward of Tokong eilandje.

A shoal, with a least depth of 3 feet ($0^{m}9$) over its northern end, lies about 7 cables northward of Tokong light-structure and about 3 cables off the head of the Bataafsche Petroleum Maatschappij. A conical buoy is moored about three-quarters of a cable southward of the shoal. A black beacon, surmounted by a cone, stands on the north-western side of the shoal.

There are several mooring buoys in the roadstead, the positions of which may best be seen on the chart. There are four unofficial beacons, each consisting of a black and yellow post, standing about 2½ cables apart in an east and west direction, about 1¾ miles northward of Tokong light-structure.

Piers.—Berthing signals.—There are several piers in Reede Balik Papan. The southernmost of these, belonging to the Government, lies about 2 cables northward of Tokong light; the remainder are lettered from A to G, inclusive, A being the one nearest the Government pier. The lengths of the mooring berths at the heads of the piers and the depths alongside are as follows:—

Government pier . .	98 feet ($29^{m}9$), depth 2½ feet ($0^{m}8$).
Government pontoon pier	394 feet ($120^{m}1$), depth 20 feet ($6^{m}1$).
C Pier (pontoon pier) .	361 feet ($110^{m}0$), depth 33 feet ($10^{m}1$).
E Pier, northern part .	525 feet ($160^{m}0$), depth 28½ feet ($8^{m}7$).
F Pier (oiling pier) . .	131 feet ($39^{m}9$), depth 30 feet ($9^{m}1$).

Piers A, B, D, southern part of E, and G are in ruins.

The berth for vessels entering is indicated by displaying the following signals at the flagstaff of the harbour office:—

The third repeat pendant above the International Code flag corresponding with the letter of the assigned pier. The same pendant above flag R indicates that the vessel should anchor in the roadstead.

Vessels lie here sheltered under all circumstances from wind and sea; if vessels are lying at the southern piers or in the roadstead head northward, and are hindered by other vessels from turning for departure, they can safely pass northward and westward of the two white conical buoys north-westward of the ruins of D pier in the roadstead.

A shoal, with a depth of 3¼ fathoms ($5^{m}9$) over it, marked on its northern side by a mooring buoy, lies about 2¼ cables west-north-westward of the head of F pier. Vessels with a draught exceeding 21 feet ($6^{m}4$) must secure with their port side alongside F pier.

Chart 3014.

There is a ruined pier, with a depth of 8 feet ($2^{m}4$) at its head, at a sawmill on the eastern side of the harbour, about 2 miles northward of Tanjong Makasar, situated about 4 miles north-north-westward of Tokong hill. Good anchorage may be obtained, in a depth of 15 fathoms ($27^{m}4$), off this pier.

A white beacon, surmounted by a ball, stands on the shore bank off

Chart 3014.

Tanjong Makasar and marks the eastern side of the channel; a black beacon, surmounted by a truncated cone, situated about 1½ miles north-north-westward of Tanjong Makasar, marks the western side of the channel.

Directions.—A vessel bound for Balik Papan should steer for the conical buoy, painted in black and red bands, surmounted by a ball, and pass eastward of it, steering 000° until the outer light-buoy, exhibiting a *white flashing* light *every five seconds*, is abeam, when she should enter the swept channel and steer 268° until between the light-buoy exhibiting a *white flashing* light *every sixteen seconds* and the black can buoy surmounted by a truncated cone, when she should steer 321°.

Vessels arriving in the offing at night should anchor outside the outer buoy and signal the vessel's name by signal lamp to the signal station.

Chart 3031, plan of Balik Papan bay.

Tidal streams.—The tidal streams in Reede Balik Papan are semi-diurnal, and attain a maximum rate of one knot; they set in the direction of the channel, the out-going stream being the stronger, and change approximately at high and low water. Between Tokong eilandje and Tokong hill the stream is very strong; this passage should be avoided.

Balik Papan.—Balik Papan, a settlement of the Bataafsche Petroleum Maatschappij, is divided into two parts by Tokong hill; the works and offices are situated on the northern side, and the European houses, Chinese and native quarters along the sea south-eastward. The two parts are connected by a tramway, running along the beach. The southern part of the settlement is named Klandasan, and there is a boat pier about half a mile southward of Tokong hill; motor boats ply regularly from here to the various piers in the bay. The remainder of the shores of Balik Papan baai, and also the adjacent land, are practically uninhabited.

At night, the glow of the lights over Balik Papan can be seen from a considerable distance.

Harbour facilities.—A small quantity of coal can be obtained. Fuel oil can be taken in alongside the piers, at a rate of about 250 tons per hour.

Provisions are obtainable; water is laid on to the piers. There is a crane close northward of the Government pier. There is a hospital at Klandasan.

There is a slipway.

Balik Papan (*Lat. 1° 16′ S., Long. 116° 49′ E.*) is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij and other steamship companies. The place is connected with the general telegraph system and there is a local telephone service.

Radio station.—There is a radio station at Balik Papan. *See* page 10.

Trade.—The principal exports are fuel oil, timber, rattan and scrap iron; the chief imports are machinery, provisions, piece goods, calicoes, glassware, paper, iron, cement, rice and flour.

Charts 3014, 2636.

WESTERN SIDE OF MACASSAR STRAIT (continued).—The greater part of the Borneo coast between Tokong hill and Tanjong

Charts 2636, 2637, 941b, 1263, 2759a.

Charts 3014, 2636.

Timbangongot, about 35 miles north-eastward, is generally higher than that southward of Balik Papan baai, with coastal hills capped by tall trees, and bordered by a sandy beach.

Tanjong Tanah Merah, about 20 miles north-eastward of Tokong hill, may be identified by a steep hill of red sand. Sambodja (Samboja), about 3½ miles north-eastward of Tanjong Tanah Merah, is a settlement of the Bataafsche Petroleum Maatschappij and consists of a few scattered huts; an unofficial white mooring buoy, from which a *violet fixed* light is exhibited at night when vessels are expected, is moored off Sambodja village. At Senipah, about 6 miles north-eastward of Sambodja, the sandy beach terminates, and the coast becomes low and marshy.

Tanjong Timbangongot, the western entrance point of Muara Djawa (Jawa), is low, but is covered with tall trees.

Charts 3030, 2636.

SUNGEI KOETEI.—Sungei Koetei (Kutei) or Mahakan may be considered the most important river on the east coast of Borneo, partly owing to the fact that Samarinda, about 10 miles above the delta, is the centre of a district rich in petroleum and coal. From the point where the river reaches the general line of the coast running northward and southward, its waters divide into four main channels, sub-divided again into many smaller passages, which form a widespread, fan-shaped delta, projecting about 20 miles eastward and about 40 miles northward from Tanjong Timbangongot. The land of the delta is low, monotonously wooded, and presents few noticeable features.

Beyond the edges of the dry land of the delta there is a fringing bank from 3 to 7 miles wide, which dries in many places, slopes steeply to depths of 5 fathoms ($9^{m}1$), and a short distance outside the depths increase to 10 fathoms ($18^{m}3$), the 100-fathom ($182^{m}9$) line being about 15 miles from the edge of the bank. A small bank, with a depth of 11 fathoms ($20^{m}1$) over it, lies 18 miles eastward of Tanjong Pelai, situated 31 miles north-eastward of Tanjong Timbangongot, and about 2½ miles inside the 100-fathom ($182^{m}9$) line.

Owing to the discharge from the rivers the banks are not marked by discoloration, and vessels should keep outside the 10-fathom ($18^{m}3$) line until they sight the approach buoys off the various mouths of the delta. In the latest survey, in 1931, of the Koetei delta it was found that the land and the fringing bank, particularly in the northern part by Muara Berau, had worked out from 5 to 8 cables farther eastward than previously shown on the charts.

There are three main channels for shipping amongst the various arms of the delta. These are: Muara Pegah (page 404), entered between Tanjong Timbangongot and Tanjong Pegah, 5½ miles eastward; Muara Bekapai (page 405); and Muara Bajor (page 406). Muara Djawa (page 403), the westernmost channel, and Muara Berau (page 408), the northernmost, are too shallow in places for general navigation.

Chart 3030.

Buoy.—A conical buoy, painted in black and white chequers, surmounted by a ball, is moored about 6½ miles south-south-eastward of Tanjong Bajor (*Lat. 0° 44′ S., Long. 117° 36′ E.*), situated about

Charts 2660b, 941b, 1263, 2759a.

Chart 3030.

24 miles east-north-eastward of Tanjong Timbangongot, and marks the edge of the bank extending from Koetei delta.

Depths.—The least depths from the sea to Samarinda, through the various arms of the Koetei delta, in 1948, were as follows :—

Muara Djawa, on the outer bank . . .	5 feet ($1^{m}5$).
„ „ , near Tjerotjok	3 feet ($0^{m}9$).
Muara Pegah, outer bar	8½ feet ($2^{m}6$).
Muara Bekapai, outer bank	9 feet ($2^{m}7$).
Muara Bajor, near outer buoy . . .	11 feet ($3^{m}4$).
„ „ , „ inner buoy	8 feet ($2^{m}4$).
„ „ , western part of Kleine Kali .	10 feet ($3^{m}0$).
„ „ , off Klamboe village . . .	15 feet ($4^{m}6$).
Muara Berau, outer bar	13 feet ($4^{m}0$).

Muara Bajor is the most suitable for large vessels, although the hairpin bends in " Kleine Kali " present some difficulty, and vessels exceeding a length of 300 feet ($91^{m}4$), unless provided with a special river-rudder, should not attempt it ; a vessel with a length of 374 feet ($114^{m}0$) has reached Samarinda.

Current.—For a considerable distance outside the delta there is either an inset or a strong outset ; outside the influence of the delta the constant south-going current through Macassar strait is encountered.

At a position about 5 miles south-south-eastward of Tanjong Timbangongot the current sets between east and south-east at a mean rate of half a knot ; at about 2¾ miles south-south-westward of Tanjong Pegah between east and north-east, at a mean rate of one knot, and at about 5½ miles east-south-eastward of Tanjong Pemaroeng, situated about 6 miles eastward of Tanjong Pegah, between south-east and north-east, at a mean rate of 1½ knots.

Pilotage.—Pilotage is compulsory, with a few exceptions, for Muara Djawa, Muara Pegah, Muara Bekapai, and Muara Bajor. The pilots are qualified to take vessels up Sungei Sanga Sanga, and up Sungei Koeti above Samarinda as far as Seboeloe. In 1947, pilots were only available for Muara Pegah. The pilots for in-going vessels should be applied for by telegraph through their agent from the Harbour master. The pilot boards the vessel close outside the light-buoy at the entrance to Muara Pegah. The pilot boat lies in the vicinity of the black buoy surmounted by a truncated cone about 6½ cables north-north-eastward of the black ball beacon with a tide-gauge (*see* page 404). Pilotage at night is only permitted for certain vessels.

Should the pilot be unable to board outside the bar, he will lead the vessel across it and board her about 3¾ miles northward of the tide-gauge beacon ; the pilot boat will exhibit a *white fixed* light.

Muara Djawa.—Beacon.—Buoys.—Sungei Doendang.—The outer bar of Muara Djawa, the westernmost arm of Koetei delta, is crossed from a position about 5 miles southward of Tanjong Timbangongot (*Lat. 0° 54′ S., Long. 117° 15′ E.*), and the channel then runs close eastward of this point. Tjerotjok lies about 6 miles northward of Tanjong Timbangongot, and the channel runs along the northern side of this island. Tanjong Dewa, where Muara Djawa unites with Muara Bajor, is situated about 11½ miles northward of Tjerotjok ; Moeara Djawa village is situated on the western bank about one mile south-westward of Tanjong Dewa.

Charts 2636, 2660b, 941b, 1263, 2759a.

Chart 3030.

During the survey, from September to December, 1932, the maximum rate of the out-going stream was 2½ knots, and that of the in-going stream 2 knots; off Moeara Djawa village a rate of 3 knots was observed, and it has been reported that the out-going stream here may attain a rate of 4½ knots, but this is probably when the river is in flood. During spring tides the direction of the tidal stream changes from a half to one hour after high water and low water.

Sungei Doendang enters the west bank of Muara Djawa opposite Tjerotjok, and is navigable for a distance of about 4 miles above its mouth, as far as the village of Soengei Tiram, situated on its northern bank; a bridge, about 3 cables in length and carrying pipes, through which oil and gas are pumped from Sanga Sanga to Balik Papan, crosses the river here. When leaving the pier with the in-going tidal stream care should be taken not to be set against the bridge, as, owing to the high pressure of gas in the pipe, serious damage might result. During the dry season the least depth in Sungei Doendang is 13 feet ($4^{m}0$), about 2½ miles above the mouth. The western entrance point of Sungei Glendong, which flows into the southern side of Sungei Doendang nearly 2 miles from the mouth, should be given a wide berth, as rocks, which dry, lie off it.

A beacon, surmounted by a cylinder painted in white and black vertical stripes, is situated about 4 miles south-south-eastward of Tanjong Timbangongot.

A conical buoy, painted in red and black horizontal bands, and surmounted by a ball, is moored about 6½ miles south-south-westward of Tanjong Timbangongot, and indicates the approach to the channel over the bar of Muara Djawa.

A black can buoy, surmounted by a truncated cone, is moored about 3 miles south-south-westward of Tanjong Timbangongot.

Muara Djawa is marked by beacons and buoys.

Directions.—There are no good landmarks for approaching Muara Djawa; even when near the approach buoy, the trees on Tanjong Timbangongot do not show very plainly. From the approach buoy vessels should steer to pass white buoys on the starboard hand and black buoys on the port hand.

Muara Pegah. — Beacons. — Buoyage. — Tide-gauge. — Muara Pegah is the deepest entrance to Muara Djawa, and is now generally used by vessels. The channel over the outer bar lies about 6½ miles south-eastward of Tanjong Timbangongot, and is marked by a light-buoy, painted in red and black bands, exhibiting a *white flashing* light of *four seconds* duration *every sixteen seconds.* Muara Pegah unites with Muara Djawa a short distance above Tjerotjok.

A tide-gauge, marked in Dutch feet (11·8 inches), giving the depth in the shoalest part of the channel through the outer bar, is situated on a black beacon, surmounted by a ball, and two reflectors, about 4½ miles south-south-westward of Tanjong Pegah (*Lat. 0° 55′ S., Long. 117° 20′ E.*). The tide-gauge was reported, in 1948, to register 6 inches too much.

A light-buoy, painted black, exhibiting a *white flashing* light *every five seconds,* is moored about 3½ miles northward of the tide-gauge beacon.

A white wooden beacon, surmounted by a ball, equipped with reflectors, is situated about 7½ cables northward of the tide-gauge

Chart 3030.

beacon, and a similar beacon, equipped with reflectors, stands about 2 miles farther northward.

A light-buoy, painted black, exhibiting a *white flashing* light of *one second* duration, *every ten seconds*, is moored about 8 cables north-north-eastward of the tide-gauge black beacon.

The tidal streams are semi-diurnal; during spring tides the maximum rate of the out-going stream is 3½ knots, and that of the in-going stream 2½ knots, but in the wet season the out-going stream may be somewhat stronger. At spring tides the tidal stream changes its direction from half an hour to one hour after the times of high and low water; at neap tides the out-going stream predominates. The stream often sets across the entrance.

Directions.—The estuary and the river are marked by buoys and beacons in accordance with the Netherlands system of buoyage, see page 9.

It is reported that flaming gasses on the northern bank of Sungei Koetei opposite the mouth of Sungei Sanga Sanga are visible at sea, and, if kept on the bearing of 354°, lead to the outer buoy off Muara Pegah. It should be borne in mind that the distance from the flare is great, and that, consequently, the bearing will alter very slowly. The vessel should pass about one cable eastward of the outer light-buoy.

For depths on the bar, *see* page 403.

For Sungei Koetei from Sungei Mariam to Samarinda, *see* page 409.

For Sungei Sanga Sanga, *see* page 409.

Muara Bekapai.—Beacon.—Buoy.—The channel over the outer bar lies south-eastward of Tanjong Pemaroeng; this point, which is the western entrance point of Muara Bekapai, and on which there is a beacon, can be identified by the trees on it, which are higher than those in its vicinity. From this point Muara Bekapai trends about 4½ miles northward to Tanjong Bekapai, and thence along the south-western side of the north-western part of the island of Boroekan. There is an inner bar, with a depth of 6 feet (1^m8) over it, about 1½ miles southward of Tanjong Bekapai, and abreast Tanjong Kee, the north-western extremity of Boroekan, is a bank with a depth of 8 feet (2^m4) extending across the channel; both these shoal parts are avoided by following Sungei Bagoesan, which branches off westward just before reaching the inner bar.

The southern part of Sungei Bagoesan is broad and straight, and is deep throughout; the northern part is narrow and tortuous, but has a least depth of 10 feet (3^m0) in the channel. There is a tide-gauge for outward-bound vessels about 1¾ miles north-north-westward of the beacon on Tanjong Pemaroeng, giving the depth in Dutch feet (*see* page 404), on the leading line through the outer bar of Muara Bekapai.

For the current in the approach to the river, *see* page 403.

A white conical buoy is moored about 1¼ miles south-eastward of Tanjong Pemaroeng.

Directions.—Tanjong Pemaroeng (*Lat. 0° 53′ S., Long. 117° 26′ E.*) and Datoe, a low islet covered with high trees, about 4¾ miles north-eastward of the beacon on Tanjong Pemaroeng, are useful marks for a vessel approaching Muara Bekapai. The beacon on Tanjong Pemaroeng in line with the white conical buoy south-eastward of that point, bearing 308°, leads over the outer bar. Vessels pass westward of this buoy, and thence along the eastern side of Pulau Pemaroeng.

Charts 2636, 2660b, 941b, 1263, 2759a.

Chart 3030.

When rounding the north-eastern extremity of this island, to enter Sungei Bagoesan, attention should be paid to the tidal streams, as the out-going stream sets eastward and the in-going stream northward. After rounding this point, the southern bank should be kept at a distance of about three-quarters of a cable, and a mid-channel course held through the straight, southern reach of Sungei Bagoesan. Some of the marks in Sungei Bagoesan are equipped with reflectors.

After passing the southern signal post, which is situated on the eastern bank of the northern end of the straight reach, a mid-channel course can be continued round the first bend, thence keeping more on the outer sides of the bends until abreast the crossing-over beacon south-westward of Tanjong Bagoesan, situated on the eastern bank about 2 miles north-north-westward of the signal post mentioned above; this bend should be crossed with the beacon bearing 195°, astern, passing westward of the white conical buoy marking the bank extending southward from this point. When nearing the northern signal post, situated on the point where Sungei Bagoesan unites again with Sungei Bekapai, the southern shore should be held.

After entering Muara Bekapai from Sungei Bagoesan, a mid channel course should be steered as far as the mouth of Muara Pemankaran, a distance of about 3 miles, thence holding the western bank for one mile until in Muara Bajor, when the directions given on page 407 should be followed.

Tidal streams.—At the entrance to Muara Bekapai the in-going stream commences 4 hours before high water at the entrance to Muara Bajor and has a mean rate of 2 knots; the out-going stream commences one hour after high water at the entrance to Muara Bajor, and has a mean rate of 2½ knots.

Muara Bajor.—Muara Bajor is entered between Tanjong Bajor and Tanjong Kajoe Modjara, 5 miles north-westward. Pulau Noebi lies on the northern side of the entrance, about a quarter of a mile off the northern bank and south-westward of Tanjong Kajoe Modjara; the channel runs between the coast westward of this point and Noebi, and thence close along the western part of this island, where it is very narrow. There is a clump of high trees on the southern bank, south-westward of Noebi, which appears as an islet from a distance.

Near Tanjong Pelai there are trees which are higher than those elsewhere. The hill on Pulau Toenoeng, about 1½ miles north-westward of Tanjong Pelai, is a good landmark, especially from south-eastward. It is, however, difficult to fix a vessel's position when off Muara Bajor, and care should be taken to keep in depths of over 10 fathoms ($18^{m}3$) until the position is ascertained.

Urk (*Lat. 0° 40′ S., Long. 117° 26′ E.*), a small islet in the mouth of the Trusan Klamboe, which enters Muara Bajor about 4½ miles north-westward of Noebi, is very prominent. From here the river takes a general south-westerly direction through a narrow, winding reach, the western and narrowest part of which is known as "Kleine Kali"; in one of the sharpest bends here the width is only one-third of a cable. After its junction with Muara Bekapai it widens again and becomes straighter; from the point thus formed a wide bank extends north-westward. About 2 miles farther up is Toengkoe Kajoe, and the channel runs along the north-eastern side of this islet. Klamboe

Charts 2636, 2660b, 941b, 1263, 2759a.

Chart 3030.

village is situated at the mouth of Trusan Klamboe, which flows out on the left bank about 1½ miles above Toengkoe Kajoe.

For Pilotage, *see* page 403.

Buoy.—Beacons.—A white spherical buoy is moored about a quarter of a mile westward of Noebi, and marks the northern side of the narrow channel off the western extremity of that island.

Two leading beacons, each surmounted by a triangle, stand about a quarter of a mile south-eastward of Klamboe village, and, in line bearing 111°, indicate the greatest depth in the channel off the western extremity of Trusan Klamboe. A light is exhibited from each of these beacons.

Tidal streams.—Tide-gauges.—The tidal streams, like the vertical movement of the water, are semi-diurnal; with rising water the tidal stream runs in, and out with falling water. Near Noebi, the tidal stream changes its direction from a half to 1½ hours after high water and low water there; the maximum rate observed was 2 knots, but the rate of the out-going stream may be increased considerably by floods. At the western mouth of Trusan Klamboe the in-going stream runs from about 2 hours before to half an hour before high water at the mouth of Muara Bajor, at a mean rate of three-quarters of a knot; during the remainder of the time the out-going stream runs at an average rate of 2 knots. Owing to the water from the river flowing out the out-going stream predominates, and this is usually particularly strong at Tanjong Dewa.

A tide-gauge, giving the depth in feet on the outer bar, stands on the north coast of Noebi; a tide-gauge, giving the depth in feet in the narrows off the western extremity of Noebi, is situated on the western side of the entrance to Muara Tembora, about 2½ miles above Noebi; another tide-gauge, giving the depth in feet on the bar off Klamboe village, stands on the eastern bank about one mile above this village. All three gauges are marked in Dutch feet (*see* page 404).

Obstruction.—An obstruction lies in the channel northward of Noebi and about one mile west-south-westward of Tanjong Kajoe Modjara.

Directions.—From a position about 7½ miles north-eastward of Tanjong Bajor vessels should steer to pass between Noebi and the northern bank of the river where, in 1948, there was a least depth of 10 feet ($3^{m}0$). The narrowest part of the channel runs close along the western part of the northern side of Noebi, close to the western extremity of the island and thence southward of the white spherical buoy off this point, where, in 1948, there was a least depth of 10 feet ($3^{m}0$).

There are no dangers in Kleine Kali, and vessels can steer close along the banks, bearing in mind that there is an eddy along the outer shores of the bends. Approaching the junction of Kleine Kali with Muara Bekapai, the north-eastern bank should be held to avoid the bank extending north-westward from the western entrance point; a round-topped tree on the north-eastern bank of Muara Bajor, about 2 miles north-westward of Toengkoe Kajoe (*Lat. 0° 39′ S., Long. 117° 22′ E.*), in line with the opening between the island and the bank of the river south-westward, bearing about 312°, leads through this part of Kleine Kali and into Muara Bajor. The channel then passes north-eastward of Toengkoe Kajoe, thence continuing along the north-eastern bank so as to obtain the greatest depth off Klamboe

Charts 2636, 2660b, 941b, 1263, 2759a.

Chart 3030.

village; when off the mouth of Trusan Klamboe, the leading beacons south-eastward of Klamboe village should be brought in line astern, bearing 111°, which leads close along the western extremity of Trusan Klamboe.

Care should be taken to avoid the bank extending north-westward from Tanjong Dewa, passing well north-eastward of it, and thence holding the north-eastern bank of the river; there is often a strong tidal stream round this point. Leading marks fitted with reflectors, about 9 cables south-eastward of Tanjong Moeara Berau, in line astern, bearing 120°, lead in a least depth of 14 feet ($4^{m}3$) south-westward of a black can buoy. If proceeding up Sungei Sanga Sanga, *see* page 409.

Chart 2636.

Muara Berau and approaches.—Dangers.—Beacons.—Muara Berau, the northernmost of the navigable arms of Koetei delta, is not buoyed, and, partly owing to some dangerous reefs northward of the entrance, is not recommended. The un-named point about 1¾ miles south-eastward of Tanjong Leroeng (Lerung), the eastern entrance point, situated about 23 miles north-north-westward of Tanjong Bajor, is high and steep. Pulau Leroeng lies in the entrance, and appears from seaward as a tableland; the channel runs along its western side. There is an inner bar about 2 miles southward of this island (*Lat. 0° 22′ S., Long. 117° 29′ E.*).

A small shoal, with a depth of 5 feet ($1^{m}5$) over it, lies about 7 miles north-eastward of Tanjong Leroeng.

Several dangerous reefs, some of which dry, lie from 8½ to 11 miles northward of Tanjong Leroeng; one of these, with a depth of 5 feet ($1^{m}5$) over it, lying 8½ miles northward of Tanjong Leroeng, is marked by a white beacon surmounted by a red truncated cone.

A shoal, with a least depth of 1¾ fathoms ($3^{m}2$) over it, which lies 10½ miles north-north-eastward of Tanjong Leroeng, is marked by a white beacon, surmounted by a ball.

Chart 3030.

Pulau Terentang lies about 12 miles above the entrance, dividing the river into two branches. The main channel runs along the southern side of this island, but there is a narrow passage, known as the Troesan, along the northern side. These two channels unite again northward of Meong, an islet off the south-western end of Terentang. There is a leper settlement southward of Terentang.

There is no pilot service for Muara Berau, and vessels without local knowledge should not attempt to navigate this arm of Koetei delta.

Tidal streams.—The tidal streams are semi-diurnal. The out-going stream commences about one hour after high water, and the in-going stream about one hour after low water; the out-going stream is the stronger and may attain a rate of 2½ knots.

Reede Soengai Mariam.—Dangers.—Reede Soengai Mariam is situated off the village of the same name on the northern shore of Sungei Koetei just above the junction of Muara Berau and Muara Bajor. It contains some good buildings, and there are two white tanks about 1½ miles eastward.

There are several floating wharves at Soengei Mariam, and on the opposite side of the river is a pier with an oil pipe. An oil derrick, used for boring purposes, stands close southward of Tanjong Moeara

Charts 2660b, 941b, 1263, 2759a.

Berau, and there are several similar derricks lighted at night on Tanjong Sanga Sanga (*Lat. 0° 36′ S., Long. 117° 17′ E.*), about three-quarters of a mile south-south-westward.

A rocky patch, with a depth of 10 feet ($3^{m}0$) over it, lies about 2 cables southward of the wharves at Soengei Mariam, and a similar patch, with a depth of 13 feet ($4^{m}0$) over it, lies about 1¾ miles north-eastward of the 10-foot ($3^{m}0$) patch; there are also some rocks, with a depth of 12 feet ($3^{m}7$) over them, off the wharves and about one cable offshore.

A white conical buoy, equipped with reflectors, is moored on the western side of the 10-foot ($3^{m}0$) patch. Vessels should pass southward of this buoy.

Prohibited anchorages.—Owing to the existence of oil pipes anchorage is prohibited in the areas indicated by pecked lines on the chart about one mile eastward, one mile southward and one mile westward of Soengei Mariam. Vessels must not anchor within 328 feet ($100^{m}0$) on either side of notice boards on each bank of the river.

Sungei Sanga Sanga.—Sungei Sanga Sanga flows out about 1½ miles north-westward of the junction of Muara Djawa and Muara Bajor, and is of importance owing to the settlement of the Bataafsche Petroleum Maatschappij, situated on the right bank about 6 miles up. Up to the settlement the river has an average width of half a cable, and is navigable for vessels with a draught of about 15 feet ($4^{m}6$). Except at the mouth, where the southern bank is held, a mid-channel course is held up this river; a bank, with a depth of only one foot ($0^{m}3$) over it, extends south-eastward from the northern entrance point, thereby reducing the navigable width of the entrance channel to about a quarter of a cable. Vessels not exceeding 197 feet ($60^{m}0$) in length, with local knowledge can proceed up Sungei Sanga Sanga as far as Sanga Dalam; there are several piers between the mouth of the river and Sanga Dalam, and also at Sanga Dalam.

Sungei Koetei between Soengei Mariam and Samarinda.—Balai Loemba, about 1¾ miles above Soengei Mariam, is a wooded islet separated from the southern bank of the river by a channel about three-quarters of a cable wide, with depths of from 18 to 30 feet ($5^{m}5$ to $9^{m}1$); a bank with a depth of 13 feet ($4^{m}0$) at its outer end, extends about three-quarters of a mile westward from this islet. Boeaja is a small wooded islet close off the northern bank, about 1¼ miles above Balai Loemba; Gosong Boeaja, near the opposite shore, is an islet covered with high trees.

Pelarang village is situated on the southern bank, about one mile west-north-westward of Gosong Boeaja; the remains of some old coaling wharves lie near the village. A shoal, with a depth of 14 feet ($4^{m}3$) over it, lies in the middle of the river, about half a mile north-westward of Pelarang (*Lat. 0° 34′ S., Long. 117° 12′ E.*).

Reede Samarinda.—Dangers.—Reede Samarinda, situated off the town of the same name, about 9 miles above Soengai Mariam, is bounded by the parallel of 0° 32′ S., and by the meridian of the boundary mark on the left bank of Sungei Koetei.

The town of Samarinda, which extends for about 2 miles on either side of the river, is the principal trading place of the east coast of Borneo and the headquarters of a Government official. The European

Chart 3030.

settlement and the quarters of the Chinese and native traders, are situated on the northern bank. The southern bank is occupied by native houses, partly built on rafts; there is also a residence of the Sultan of Koetei, although he generally resides higher up the river, at Tenggarong (*Lat. 0° 25′ S., Long. 116° 59′ E.*).

A rock, with a depth of 8 feet (2^{m}4) over it, lies close under the northern bank, about a quarter of a cable eastward of the Government flagstaff; just eastward of this rock is a hole, with depths of from 16 to 19 fathoms (29^{m}3 to 34^{m}7). Except for the above rock there is deep water along the northern bank.

A bank, with a depth of less than 15 feet (4^{m}6) over it, extends almost into mid-stream from the south-eastern side of the river about half a mile south-westward of the Government flagstaff at Samarinda; a small detached bank, with a depth of 16 feet (4^{m}9) over it, lies close, off the opposite bank abreast it and about one mile west-south-westward of the flagstaff.

Prohibited anchorage.—Several cables cross the river about a quarter of a mile below the Government flagstaff at Samarinda; the landing places of these cables are marked by boards, and anchorage is prohibited in their vicinity.

Tidal stream signals.—The following tidal stream signals are shown from the Government pier at Samarinda:—

By day:—

A cylinder, with a cone, point up, above it, and a cone, point down, below it.	Slack water.
A cylinder, with a cone, point up, above it.	In-going stream.
A cylinder, with a cone, point down, below it.	Out-going stream.

At night:—

Three *white* lights, disposed horizontally.	Slack water.
Three *white* lights, disposed in the form of a triangle, point up.	In-going stream.
Three *white* lights, disposed in the form of a triangle, point down.	Out-going stream.

Piers.—The Government pier at Samarinda is 505 feet (153^{m}9) long, with depths of from one to 6 feet (0^{m}3 to 1^{m}8) alongside. There is also a Government pier, 289 feet (88^{m}1) long, with a depth of 3½ feet (1^{m}1) alongside. The Resident's pier has a least depth of 17 feet (5^{m}2) alongside. There is a wooden pier, available for vessels about 260 feet (79^{m}2) long, with a least depth of 10½ feet (3^{m}2) alongside at the entrance to Sungei Karang Asam, about 8 cables above Samarinda; there is a landing stage, 262 feet (79^{m}9) long, at this pier. There is a pier, 56 feet (17^{m}1) long, with a depth of 28 feet (8^{m}5) at its head, close westward of the entrance to Sungei Karang Asam, and there is a pier, 64 feet (19^{m}5) long, with a least depth of 29 feet (8^{m}8) alongside, available for a vessel about 200 feet (61^{m}0) long, northward of Sungei Mangies, situated on the west bank, about 1½ miles above Samarinda.

Harbour facilities.—Coal can be obtained at Loah Boah (*see* page 411), and fuel oil at Sanga Sanga. Provisions and water may be obtained. There is a hospital at Samarinda. The climate is considered to be unhealthy for Europeans, as the town is surrounded by dense damp jungle.

Samarinda is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. There is daily communication with Soengei

Charts 2636, 2660b, 941b, 1263, 2759a.

Chart 3030.

Mariam, Sanga Sanga, and Tenggarong, 22 miles above Samarinda, by motor boat.

There is a tide-gauge at the Harbour master's office.

Charts 3030, 2636.

Sungei Koetei above Samarinda.—Light.—Buoy.—Sungei Koetei is easily navigated up to Tenggarong, and a vessel can always depend on a least depth of 23 feet ($7^{m}0$). The in-going stream has been observed during the months from July to October as far up as Muara Moentei, 112 miles above Samarinda.

Loa Bakong (*Lat. 0° 32′ S., Long. 117° 06′ E.*) is a village on the north-western bank, about 4 miles above Samarinda. A bank, with a depth of 7 feet ($2^{m}1$) over it, lies off the village, and is marked by a conical buoy, painted black and white in horizontal bands; vessels not calling at Loa Bakong should hold the opposite shore, where there is a warning board inscribed "Steenen midden rivier" (rocks in the middle of the river). The rocks referred to lie from a quarter to half a mile westward of the warning board, and are marked by a conical buoy, painted black and white in vertical stripes.

Loa Boah, on the same bank about 5 miles above Samarinda, is a shipping place for the adjacent coal mines; the same tidal stream signals are shown here as at Samarinda (page 410). A telephone cable crosses the river about 2 cables below the pier and the landing place of this cable on the western bank is marked by a white board inscribed "Telefoonkabel. Niet ankeren" (Telephone cable. Anchorage prohibited); vessels should not anchor within one cable of either side of the cable. There is a pier at Loa Djanan, on the eastern side of the river, about 1¼ miles above Loa Boah.

Tanjong Berhala is a point on the western bank about 14 miles above Samarinda; a bank, with a depth of 14 feet ($4^{m}3$) over it, extends nearly into the middle of the river from this point. A rocky patch, with a depth of 4 feet ($1^{m}2$) over it, lies close to the shore opposite Tanjong Berhala. A cable crosses the river at Tanjong Batoe Berhala, about three-quarters of a mile northward of Tanjong Berhala.

Loa Koeloe coaling pier, 197 feet ($60^{m}0$) long, with a depth of 13 feet ($4^{m}0$) alongside, is situated on the western bank about 16 miles above Samarinda, and is the largest shipping place for coal on Sungei Koetei; a light is exhibited from the pier. There is also a pier, 190 feet ($57^{m}9$) long, with a depth of 14 feet ($4^{m}3$) alongside, and above this pier there is a pontoon pier, 138 feet ($42^{m}1$) long. Tidal stream signals are shown as at Samarinda (page 410). Two high tension cables, about half a cable apart, cross the river about a quarter of a mile below Loa Koeloe; the landing places of each cable are marked by boards, and anchorage is prohibited in this vicinity.

Chart 2636.

Tanjong Loeton lies on the western side of the river about 4 miles above Loa Koeloe; a telephone cable crosses the river here. A small shoal, with a depth of 5 feet ($1^{m}5$) over it, and a rock which dries, lie near the eastern bank of the river, opposite Tanjong Loeton. Tenggarong is a long, narrow island just above Tanjong Loeton (*Lat. 0° 27′ S., Long. 116° 59′ E.*), and may be passed on either side; a shoal extends about a quarter of a mile from the northern extremity of this island.

The large village of Tenggarong, containing the residence of the Sultan of Koetei, is situated on the western bank just above Pulau

Charts 2660b, 941b, 1263, 2759a.

Chart 2636.

Tenggarong. Perdjiwa, containing a large timber sawmill and pier, which has a depth of 6½ feet (2^{m}0) alongside, is situated on the opposite bank; tidal stream signals are shown as at Samarinda. A telephone cable, marked by a board on the western bank, crosses the river about a quarter of a mile northward of the flagstaff in front of the Sultan's palace.

Loa Boekit Ilir and Loa Boekit Oeloe, about 25 miles above Samarinda, Loa Tebo and Toajan, 26 and 28 miles, respectively, above Samarinda, are shipping places for the coal mines. Vessels with a length of 262 feet (79^{m}9) can lie alongside the coaling pier at Loa Boekit. Pulau Joepa lies in a bend of the river about 31 miles above Samarinda; owing to overhanging trees the narrow passage southward of this island is not recommended. There is a pier north-eastward of Telok Batoe Dinding, on the southern bank, about 4 miles above Pulau Joepa.

Seboeloe (Sebubu), about 44 miles above Samarinda, is a Chinese and native trading place for forest produce.

A vessel with a draught of 12 feet (3^{m}7) can ascend Sungei Koetei at lowest water level as far as Long Iram, 220 miles above Samarinda; without knowledge of the river it is advisable to obtain instructions from the harbour master at Samarinda.

WESTERN SIDE OF MACASSAR STRAIT.—Coast (continued).—The coast between the mouth of the Muara Berau and Sangkoelirang baai, about 75 miles north-north-eastward, is low and overgrown with mangroves. A hilly ridge, broken in many places, runs parallel with the southern part of this coast and from about 6 to 8 miles inland, but the summits can only be identified when close inshore. Sekerat gebergte, which attains an elevation of 2,142 feet (652^{m}9), westward of Sangkoelirang baai, is considerably higher than the surrounding hilly land and appears as an island from a distance.

Tanjong Santan, 19½ miles northward of Tanjong Leroeng (page 408), may be identified by a row of casuarina trees on it, but the point is only noticeable when close to the coast. Anchorage may be obtained by vessels with local knowledge eastward of Tanjong Santan, in a depth of about 11 fathoms (20^{m}1), soft mud.

Obstruction.—An obstruction, the position of which is doubtful, was reported, in 1945, to lie 7 miles south-eastward of Tanjong Santan.

Coast.—Tanjong Sangatta, about 27 miles northward of Tanjong Santan, is only noticeable when near the coast. Sungei Sangatta flows out about 1¾ miles northward of the point, and is navigable for small craft; there is a depth of 2 feet (0^{m}6) at its mouth; the entrance is marked by an unofficial beacon and the river by unofficial buoys. Sangatta village, a collecting place for forest produce, is situated some distance up the river.

About midway between Tanjong Sangatta and Tanjong Boengaloen (Bungalun), 14½ miles north-north-eastward, is an isolated hill, 567 feet (172^{m}8) high, with a small square wood on its summit. The rivulets Glam, Merangas, and Batoeta (Batuta) flow out near this hill, but they have depths of barely one foot (0^{m}3) in their mouths.

Tanjong Boengaloen (*Lat. 0° 38′ N., Long. 117° 42′ E.*) can only be identified when close to the coast; there are many casuarina trees southward of it. Sungei Boengaloen flows out close westward of the

Charts 2660b, 941b, 1263.

Chart 2636.

point, and is navigable at high water for small craft of 4 feet ($1^{m}2$) draught up to Boengaloen village; the mouth of the river is marked by five unofficial floating beacons, which should be passed on the starboard hand on entering, and abreast the innermost is an unofficial buoy which should be passed on the port hand.

Telok Golok is entered about 15 miles north-eastward of Tanjong Boengoelan, and the small rivers Kari Orang and Golok, only navigable for native craft, flow into it; a rock, with a depth of 3 feet ($0^{m}9$) over it, lies in the middle of the entrance to the bay.

Almost the whole of the coast between Tanjong Sangatta and Telok Golok is foul within the 10-fathom ($18^{m}3$) line. Owing to the coral reefs lying just within the 100-fathom ($182^{m}9$) line, passing vessels should not approach the coast within a distance of 14 or 15 miles; at this distance the trees on the coast can be seen in clear weather, and Sekerat gebergte is a good landmark.

Islands and dangers.—Beacons.—For about 20 miles northward of Tanjong Santan the coast is fringed by extensive reefs, on which are several groups of wooded islands. Occasional inlets in the coastal reef, some of which are marked by unofficial beacons, afford good anchorage to vessels with local knowledge.

Kerindingan eilanden, the principal group, lie about 7 miles northward of Tanjong Santan, on a reef extending over 4 miles offshore; they are low but are covered with tall trees, and in clear weather can be seen from a distance of from 12 to 14 miles. Barat Basa lies on a detached reef about one mile southward of Kerindingan eilanden; there are some trees in the middle part, and it is surrounded by a white sandy beach. Melahin, about 1½ miles north-north-westward of Kerindingan eilanden (*Lat. 0° 05′ N., Long. 117° 33′ E.*), shows as a small dark wood against the Borneo coast.

Bontang eilanden lie on the coastal reef nearly 3 miles north-north-westward of Kerindingan eilanden, and within one mile of the coast; about 1¼ miles farther north-westward are Agar Agar eilanden, situated on the coastal reef and about three-quarters of a mile offshore. Bontang village, built on piles, is a fishing settlement and a trading place for forest produce; it can be reached through a channel in the coastal reef between Bontang and Agar Agar eilanden. On the northern side of the entrance to this channel is a detached reef, about 1½ miles in diameter; the channels westward and southward of this reef both have depths of over 11 fathoms ($20^{m}1$), and are marked by unofficial beacons, but it is advisable to use them only at low water, when the edges of the reefs can be seen. A reef, with a depth of one foot ($0^{m}3$) over it, lies about 2 miles south-south-westward of the mouth of Sungei Boengaloen, and is marked by a black beacon surmounted by a cone.

Anchorages.—Directions.—Along the northern side of Kerindingan eilanden is a wide gap in the coastal reef, which affords anchorage to vessels with local knowledge, in depths of from 8 to 11 fathoms ($14^{m}6$ to $20^{m}1$), soft mud, near the north coast of the eastern of these two islands. Approaching from northward Barat Basa should be kept open eastward of the Kerindingan group until Melahin bears 270°; when proceeding into the gap in the coastal reef vessels should anchor before Barat Basa shows between the two Kerindingan eilanden. Good anchorage can be obtained by vessels with local knowledge in the

Charts 2660b, 941b, 1263.

Chart 2636.

channel along the southern side of the detached reef, in a depth of 15 fathoms ($27^{m}4$) soft mud, with Barat Basa, bearing about 174°, open westward of the eastern Kerindingan eiland; the inner part of this channel terminates in a basin, in which there are depths of from 4 to 5 fathoms ($7^{m}3$ to $9^{m}1$), about a quarter of a mile eastward of Bontang village.

Off-lying dangers.—Beacon.—There are numerous dangers within the 100-fathom ($182^{m}9$) line off the coast between Tanjong Santan (*Lat. 0° 02′ S., Long. 117° 31′ E.*) and Tanjong Boengaloen; the positions of these dangers can best be seen on the chart. Three dangerous reefs lie just within the 100-fathom ($182^{m}9$) line from 7 to 8 miles south-south-eastward of Tanjong Boengaloen, and another reef lies about 7½ miles eastward of this point. The reefs off this coast are not marked by discoloration, but discoloured water from the rivers may give the false impression of shoals.

Attaka reef, with a depth of 6½ fathoms ($11^{m}9$) over it, lies outside the 100-fathom ($182^{m}9$) line and about 25 miles north-eastward of Tanjong Leroeng. Sangatta reef, also outside the 100-fathom ($182^{m}9$) line, lies about 7½ miles south-eastward of Tanjong Sangatta; it is marked by an unofficial beacon, surmounted by a red triangle; the reef dries in its southern part, and has a depth of 1½ fathoms ($2^{m}7$) over its northern part, and is marked by discoloured water and ripples. A coral reef, with a depth of 4 fathoms ($7^{m}3$) over it, lies just within the 100-fathom ($182^{m}9$) line 2¼ miles north-westward of the 1½-fathom ($2^{m}7$) head of Sangatta reef.

Chart 3031, plan of Sangkulirang bay.

Miang besar.—Anchorage.—Miang besar, about 6 miles south-eastward of Tanjong Segloe (Seglu), the eastern entrance point of Telok Golok, is a thickly wooded island, and forms a useful landmark for vessels approaching Sangkoelirang baai from southward or south-eastward. The island is separated from the coast northward by a channel nearly 2 miles wide. A number of reefs lie within a distance of 3 miles of the north-western extremity of the island, for which the plan should be consulted; there is also a reef, which dries, about 4 miles westward of the southern extremity and just within the 100-fathom ($182^{m}9$) line; a 3¾-fathom ($6^{m}9$) patch lies 3½ cables west-south-westward of it.

Anchorage, moderately well sheltered at all times, can be obtained north-westward of the north-eastern extremity of the island, from 2 to 3 cables from the coastal reef, in a depth of 12 or 13 fathoms ($21^{m}9$ to $23^{m}8$), mud; when making for this anchorage from either westward or eastward, the latter being preferable, vessels should hold along the fringing reef of the island, which is clearly marked by discoloration when the water is below the mean level.

Sangkoelirang baai. — Light. — Beacons. — Sangkoelirang (Sangkulirang) baai, like Balik Papan and other inlets southward, is the estuary of many streams, but the only river of any importance is Sungei Sangkoelirang. The western shore is low, but wooded with high trees; Tanjong Tanah Merah (*Lat. 0° 51′ N., Long. 118° 01′ E.*), on the western side of the entrance, is composed of red rock, and has a couple of noticeable huts on it. The eastern shore is hilly, but the only noticeable hills are on Tanjong Batoe (Batu), the eastern entrance point, and on Djopang (Jopang), about 4½ miles north-westward.

Charts 2660b, 941b, 1263.

Chart 3031, plan of Sangkulirang bay.

On either side are coral reefs, sandbanks, and islands, which leave a navigable channel, from a half to one mile wide. Miang kechil, about 4½ miles southward of Tanjong Tanah Merah and about 6 cables off the western entrance point, is overgrown with mangroves and covers at high water.

A light is exhibited, at an elevation of 40 feet ($12^{m}2$), from a black iron beacon, on the eastern edge of a bank which extends about 2 miles eastward from Miang kechil (*Lat. 0° 47′ N., Long. 118° 02′ E.*).

Rending, nearly 2 miles northward of Tanjong Tanah Merah and half a mile off the western shore of the estuary, has a white sandy wall, about 7 feet ($2^{m}1$) high, round its southern part; between this wall and the high middle part, which is covered with coconut trees, are some small marshes, whilst the northern part is entirely marshy.

A black beacon, surmounted by a staff and framework, stands on the north-eastern edge of a reef, with a least depth of 1¾ fathoms ($3^{m}2$) over it, about one mile south-eastward of Rending, and marks the western side of the channel.

Senoempa (Senumpa), about half a mile north-westward of Rending and about 3½ cables off the western shore of the estuary, is marshy in the southern part; the hilly northern part may be identified by some coconut trees and cultivated fields. Sirrih, close off the eastern side of Senoempa, is a rock covered with vegetation. These three islands lie on a bank, which partly dries, separated from the western shore by a deep channel, named Muara Soealang.

A beacon, surmounted by a white ball, stands about one mile eastward of Sirrih, and marks some rocks on the eastern side of the channel. It was reported, in 1948, that this beacon was not visible at high water. A black beacon, surmounted by a cone, stands about half a mile north-north-eastward of Sirrih, and marks the edge of the bank on the western side of the channel. A black beacon, surmounted by a staff and framework, stands close off the north-eastern extremity of Senoempa.

Antoeng (Antung) and Badjo (Bajo) close to the eastern shore and 5 and 11 cables, respectively, northward of Tanjong Batoe, are low islands covered with vegetation. About one mile westward of Tanjong Batoe is a small, rocky islet with some bushes on it.

Benoa Baroe (Baru) is a settlement situated on the western side of the mouth of Sungei Sangkoelirang, nearly 3 miles northward of Senoempa.

Reede Benoa Baroe.—Light.—Beacon.—Reede Benoa Baroe lies eastward of Singkoeang eiland, between the parallel of the black beacon surmounted by a cone, marking a rock nearly in mid-channel, about three-quarters of a mile northward of Benoa Baroe, and the parallel of the southern extremity of the island, about 1¼ miles southward of the beacon.

A light is exhibited from the head of the pier at Benoa Baroe.

Vessels can lie alongside the pier, at the head of which there is a depth of 17½ feet ($5^{m}4$), and those with a draught of 20 feet ($6^{m}1$) can reach this place at all times. Benoa Baroe is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Northward of the pier there is a jetty for launches.

Sungei Sangkoelirang above Benoa Baroe has depths of from 10 to 16 feet ($3^{m}0$ to $4^{m}9$) up to Sampajau, a settlement on the right bank about 12 miles above Benoa Baroe, and is navigable for sea-going

Chart 3031, plan of Sangkulirang bay.

vessels with local knowledge; there is a wharf, with a depth of 19 feet ($5^{m}8$) alongside, at Sampajau. The tidal stream here sometimes attains a rate of 3½ knots at spring tides.

Directions.—Sangkoelirang baai may be approached with Tanjong Tanah Merah (*Lat. 0° 51′ N., Long. 118° 01′ E.*) in line with the light-beacon eastward of Miang kechil, bearing about 324°, but, unless proceeding to the anchorage off Miang besar, vessels should not go westward of this alignment; thence a northerly course should be steered to pass about one mile eastward of this light-beacon, and when it bears 250° vessels should steer 336° over the outer bar; this bar consists of hard ground, and the least depth on this course will be 3¾ fathoms ($6^{m}9$). When past the bar the beacons are a sufficient guide. Vessels should pass westward of the beacon situated about one mile eastward of Sirrih.

Tidal streams.—When approaching the bay the influence of the in-going and out-going tidal streams is felt, and more in the offing a north-east-going current with a rate of half a knot is sometimes experienced. The tidal streams in the vicinity of the pier at Benoa Baroe are strong; the out-going stream, which may attain a rate of 3¼ knots, sets on to the pier, the in-going stream sets off it.

Chart 2636.

Coast.—**Light.**—Tanjong Paggar, about 20 miles east-south-eastward of Tanjong Batoe, is formed by a hilly ridge, with a strip of low, mangrove-covered land at the base, and is steep-to, the 100-fathom ($182^{m}9$) line being less than one mile offshore. Thence to Tanjong Mangkalihat, about 38 miles east-north-eastward, the coast is hilly with marshy land in places where the slopes do not reach the coast; this part of the coast is uninhabited.

About midway between Tanjong Paggar and Tanjong Poeloe (Pulu) Setebah, about 20 miles eastward, is Tindeh Hantoe (Hantu) gebergte, which can be plainly distinguished from the range near Tanjong Poeloe Setebah when seen from southward. Mangkalihat, a mountain situated 3 miles west-south-westward of Tanjong Mangkalihat, is 1,079 feet ($328^{m}9$) high, and is most noticeable when seen from northward or southward; from other directions it does not stand out clearly from the surrounding mountains. Antoe, about 7 miles westward of Tanjong Mangkalihat and 2,457 feet ($748^{m}9$) high, is steep on the western side. *See* view facing this page.

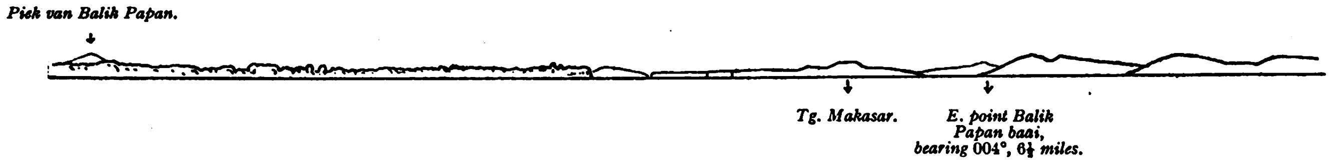
Telok Menoembar (Menumbar), immediately eastward of Tanjong Paggar, is mostly occupied by a bank of mud and sand. Sungei Menoembar (Menumbar) flows into this bay.

Telok Bakong is entered between Tanjong Menoembar (Menumbar), a low point covered with mangroves, situated 12½ miles eastward of Tanjong Paggar, and Tanjong Poeloe Setebah; the depths in this bay are too great to afford good anchorage. A ridge, with irregular depths of from 16 to 37 fathoms ($29^{m}3$ to $67^{m}7$), extends about 4 miles southward from the eastern part of the bay, and on the western side of this ridge are some shoals, with depths of from 3 to 4¼ fathoms ($5^{m}5$ to $7^{m}8$) over them. A wooded islet lies close off the eastern side of Tanjong Poeloe Setebah.

Telok Sendaren lies immediately north-eastward of Tanjong Djaran Djaran (Jaran Jaran), a low point about 7 miles eastward of Tanjong Poeloe Setebah, and affords anchorage to vessels with local knowledge

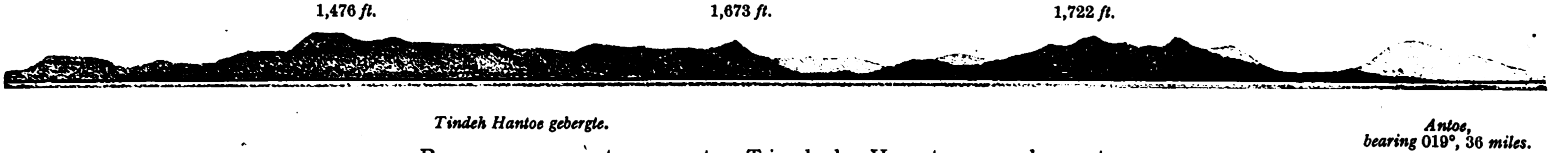
Charts 2660b, 941b, 1263.

To face page 416.



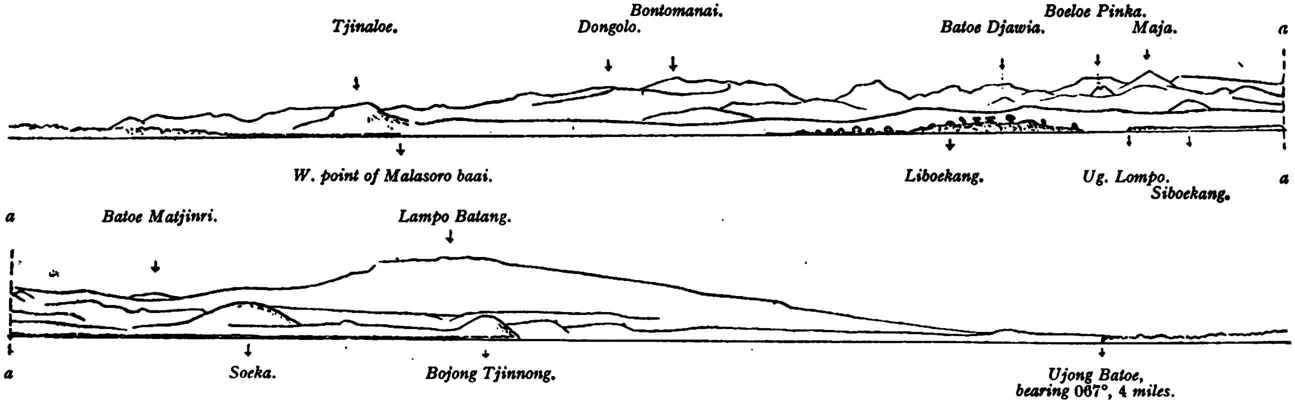
Borneo, east coast. Southern approach to Balik Papan baai.

(*Original dated* 1931.)



Borneo, east coast. Tindeh Hantoe gebergte.

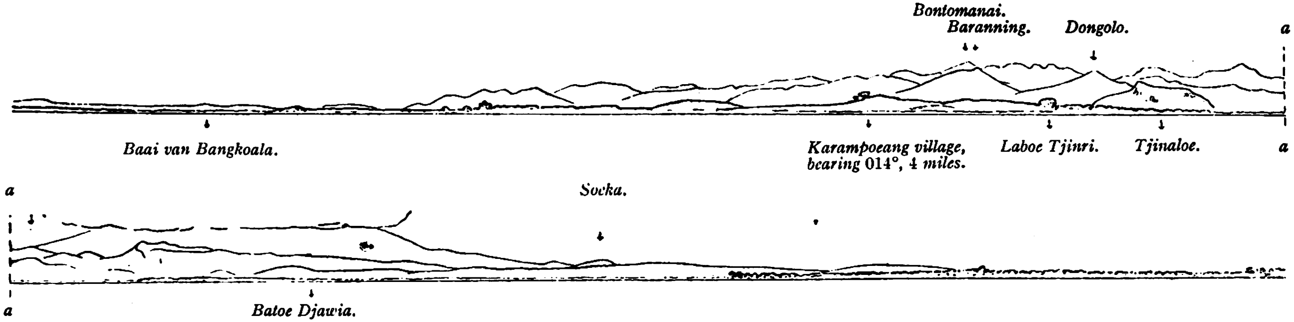
(*Original dated* 1903.)



View, in two parts, of south-west coast of Celebes.

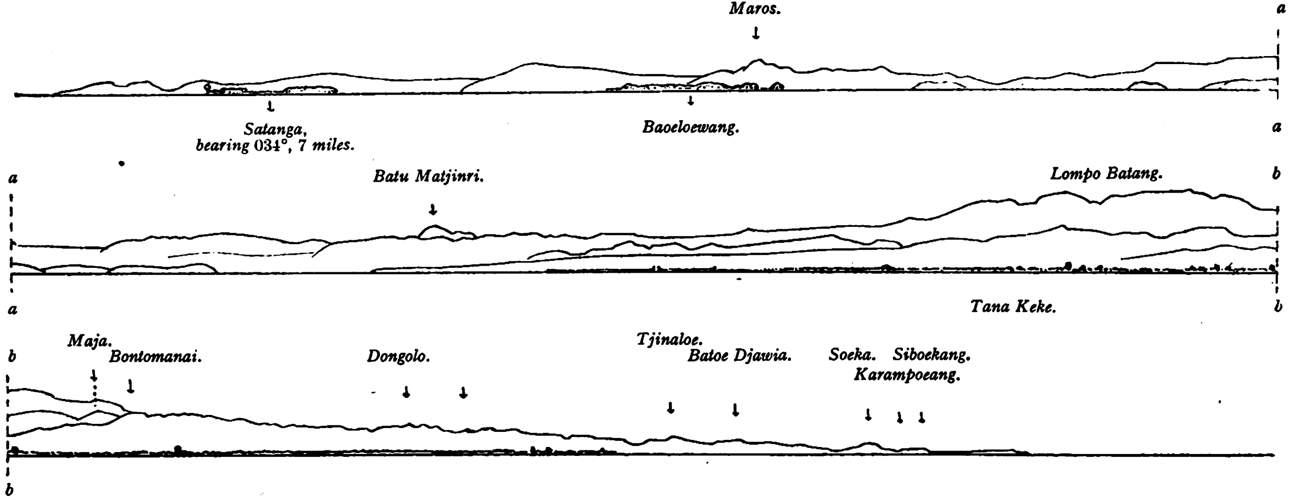
(*Original dated* 1931.)

To face page 417.



View, in two parts, of approach to Laikang baai.

(*Original dated* 1931.)



View, in three parts, of south-west coast of Celebes, from south-westward of Satanga.

(*Original dated* 1931.)

Chart 2636.

in the northern part, in depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$), sheltered from north-easterly winds. A reef, with a depth of 2½ fathoms ($4^{m}6$) over it, lies about half a mile north-eastward of Tanjong Djaran Djaran. Three islets lie on the edge of the coastal reef within 3½ miles north-eastward of the north-eastern entrance point of Telok Sendaren.

Tanjong Mangkalihat, the easternmost point of Borneo, is formed by a thickly wooded mountain ridge, sloping gradually to the sea, and covered with mangroves at the foot; it can be safely rounded at a distance of one mile. Near the point the constant southerly current, described on page 380 is sometimes very strong.

A light is exhibited, at an elevation of 131 feet ($39^{m}9$), from a white iron framework structure, 105 feet ($32^{m}0$) in height, situated on the point about 2 miles southward of Tanjong Mangkalihat.

For the description of the Borneo coast northward of Tanjong Mangkalihat, *see* page 461.

Off-lying islet and dangers.—Birah Birahan, about 8½ miles south-eastward of Tanjong Paggar (*Lat. 0° 48′ N., Long. 118° 23′ E.*), is a low islet covered with trees, with an elevation of 134 feet ($40^{m}8$); it is fringed by a steep-to reef, which extends about 7½ cables west-south-westward. Temporary anchorage, in depths of from 20 to 25 fathoms ($36^{m}6$ to $45^{m}7$), coral, can be found in places from one to 1¾ cables off the islet.

Johanna Antonia, about 5½ miles east-north-eastward of Birah Birahan, is a steep-to coral reef, with a depth of 3¼ fathoms ($5^{m}9$) over it, plainly marked by discoloration.

A shoal, with a least depth of 3¾ fathoms ($6^{m}9$) over it, lies about 2¾ miles southward of Tanjong Paggar.

Chart 2637.

SOUTHERN ENTRANCE TO MACASSAR STRAIT.—Between Lima eilanden (page 388) and the adjacent reefs, lying on the edge of the great bank extending from the Borneo coast, and Spermonde archipel, off the southern part of the west coast of Celebes, are a number of isolated coral banks, rising abruptly from great depths, with raised ridges and islands on their northern and eastern edges. These coral banks comprise two distinct groups, thus dividing this portion of the southern entrance to Macassar strait into three main channels.

Western channel.—Islands and dangers.—On the western side of this channel are Lima eilanden and the reefs lying southward of them, including Aurora bank, described on page 388. In the southern entrance is Sibbalds bank, with a least depth of 4¼ fathoms ($7^{m}8$) over it, lying about 41 miles southward of Sabaroe; a shoal, with a depth of 6 fathoms ($11^{m}0$) over it, lies about 15 miles south-eastward of the shoalest part of Sibbald's bank, and a 6½-fathom ($11^{m}9$) patch about 5 miles north-eastward. Partly owing to the fact that no land is visible whereby vessels can determine their position so as to avoid Sibbalds bank, and partly because no saving of distance is effected, this channel is seldom used.

The eastern side of this channel is formed by an extensive bank, with depths of less than 100 fathoms ($182^{m}9$) over it, on the northern end of which are several islands and dangers. Kaloe Kaloekoeang (Kalu Kalukuang), on the north-western edge of the bank and 35 miles

Chart 2637.

eastward of Sabaroe, is covered with coconut trees and is visible at least 12 miles in clear weather; there is a village on the north-west coast, where the native chief of this group resides. Close northward of the eastern extremity is a small pier with a hut on it; a primitive prau harbour has been constructed of coral rock in the vicinity, and can be reached through a channel in the coastal reef leading southward of a prominent mangrove tree on the reef. Togo Togo, a small islet, lies on the coastal reef off the southern extremity. Anchorage can be obtained by vessels with local knowledge off Kaloe Kaloekoeang in both monsoons. The depths are comparatively great on the portion of the bank lying southward and south-south-westward of this island, but a number of reefs, with depths of from 2½ to 4¼ fathoms (4^m6 to 7^m8) over them, lie along the edge of the bank for a distance of about 15 miles north-eastward.

Boetong Boetongan (Butong Butongan) (*Lat. 5° 03′ S., Long. 117° 55′ E.*), the northernmost of the group, lies on the eastern edge of the bank and about 16 miles north-eastward of Kaloe Kaloekoeang, and is covered with banana trees. Banko Bankoang lies about 7 miles southward of Boetong Boetongan and is a similar island. Between these two islands the bank is encumbered with shoals.

A 4¾-fathom (8^m7) patch lies about one mile south-south-eastward of Banko Bankoang.

Doang Doangan kechil and Doang Doangan besar, 3½ and 11 miles, respectively, southward of Banko Bankoang, are wooded with coconut trees and are visible at least 12 miles in clear weather; there is a village on the western side of Doang Doangan besar. Both islands are fringed with reefs which dry.

There is sheltered anchorage for vessels with local knowledge, in the east monsoon only, off the western sides of the last four islands described above, as they lie close to the steep-to eastern edge of the bank.

Middle channel.—Islands and dangers.—Light.—Beacons.— The channel between the bank on which Doang Doangan eilanden lie and Laars banks, about 18 miles east-south-eastward, is clear of dangers and deep; it is frequently preferred by vessels proceeding between Surabaya and Makasser, via Straat Madoera, in place of that eastward of Laars banks.

Marasende, an island 16½ miles north-eastward of Doang Doangan kechil, may be identified by a group of very high casuarina trees on its northern extremity, visible about 16 miles in clear weather. There is a village on the western side of the island. Karang Marasende, about 5 miles south-south-westward of Marasende, is a steep-to coral reef which dries.

Laars banks consist of three isolated coral reefs, covered with fine white sand, rising steeply from great depths. Bone Laisi, the southern reef, has a least depth of 6 fathoms (11^m0) on a ridge along the northern part of the eastern side; Pisani bank, with a least depth of 12 fathoms (21^m9) over it, lies near the southern end of Bone Laisi, and a least depth of 8 fathoms (14^m6) was reported, in 1948, in this vicinity. A bank, with a depth of 11 fathoms (20^m1) over it, was reported, in 1948, to lie about 2½ miles southward of Pisani bank, and a bank, with a depth of 15 fathoms (27^m4) over it, was reported, in 1944, to lie about 10 miles farther southward.

Charts 941b, 1263, 2759a.

Chart 2637.

Bone Pute is separated from Bone Laisi by a deep channel about 2 miles wide, through which the current runs at a considerable rate, causing ripplings and a turbulent sea; the least depth on Bone Pute at the northern end, is 3½ fathoms ($5^{m}9$).

The islands Dewakang besar and Dewakang kechil, both covered with coconut trees and inhabited, lie on the northern reef; the former is visible from 12 to 13 miles in clear weather, and the latter from 13 to 14 miles. The reef on which Dewakang besar lies forms a funnel-shaped opening on the southern side, where small vessels with local knowledge can obtain good anchorage; there is a stone pier for praus on the south-eastern side of the island.

A light (*Lat. 5° 24′ S., Long. 118° 26′ E.*) is exhibited, at an elevation of 105 feet ($32^{m}0$), from a white iron framework structure, 98 feet ($29^{m}9$) in height, situated on the northern extremity of Dewakang besar.

Three pairs of leading beacons mark the channel in the opening in the reef southward of Dewakang besar described above. The first pair lies in the southern part of the opening, and are in line on the bearing 296°; each beacon is painted black, and surmounted by a cone, the front beacon having the cone point up, and the rear beacon point down. The second pair, also black, each surmounted by a cone, point up, lies near the eastern side of the opening, and are in line bearing 339°; a black can buoy is moored almost on the line joining these two beacons and about 3 cables north-north-westward of the front beacon. The third pair, painted white and each surmounted by a ball, lies near the head of the inlet, and are in line bearing about 321°.

Chart 941b.

Directions.—After leaving Straat Madoera, and having rounded Kangean eilanden, course may be shaped direct for the Middle channel, thence passing northward of Dewakang besar and making for Makasser by the route northward of Gosseiia reef and Dajang Dajangan (page 422). Vessels from the Java sea, proceeding northward along the eastern side of Macassar strait, also frequently use this channel.

Chart 2637.

Caution.—When crossing Macassar strait by the route northward of Dewakang besar, it must be borne in mind that the constant southerly current runs across the vessel's course, and may attain a rate of 2 knots during the strength of the South-east monsoon.

Eastern channel.—Dangers.—Light.—The channel between Laars banks and De Bril bank, about 38 miles eastward of their southern end, is frequently used by vessels proceeding between Surabaya and Makasser.

De Bril bank is an atoll-shaped coral reef, the edge of which dries, except in one part on the south-western side close northward of the lighthouse, where a channel, with depths of from 7 to 14 feet ($2^{m}1$ to $4^{m}3$), gives access to a deep basin.

A light is exhibited, at an elevation of 66 feet ($20^{m}1$), from a white octagonal tower with three galleries, 75 feet ($22^{m}9$) in height, situated near the south-western edge of De Bril bank.

De Greve shoal, about 11 cables in extent, slightly discoloured and with a least depth of 6 fathoms ($11^{m}0$), sand and stones, over it, lies about 29 miles west-north-westward of De Bril bank.

Charts 1263, 2759a.

Chart 2637.

Karang Bankauluang, with a least depth of 5¼ fathoms (10ᵐ1) over it, lies about 19 miles southward of Dewakang kechil, and is very steep-to.

Bankaoeloeang (Bankauluang), about 10½ miles eastward of Dewakang kechil, is an island partly covered with coconut trees; it is only visited occasionally by natives, and affords no anchorage.

Taka Bakang (*Lat. 4° 58′ S., Long. 118° 32′ E.*), about 26 miles north-north-eastward of Dewakang besar, is a reef which dries, but is not marked in any way when covered; at low water it can be seen from a distance of about 5 miles.

Tidal streams.—In the vicinity of De Bril bank the west-going stream predominates, but its direction is more influenced by the wind than its rate. A fairly strong east-going stream is sometimes experienced, especially during the North-west monsoon.

EASTERN SIDE OF MACASSAR STRAIT.—Aspect.—Approaching the south-west coast of Celebes, which forms the south-eastern side of the southern entrance to Macassar strait, from southward or westward, under favourable conditions of weather, Lompo Batang or Piek van Bonthain, 9,513 feet (2,899ᵐ6) high, situated about 32 miles north-eastward of Ujong Laikang, the south-western extremity of Celebes, will be sighted long before the off-lying islands and low wooded coast is visible.

Charts 3128, plan of Laikang and Malasoro bays, 2637.

The mountains south-westward of Lompo Batang are of little use for navigation at any distance from the coast, as the various peaks are not easily identified unless familiar with the aspect of this coast. Maja, about 14 miles south-westward of Lompo Batang, is a conical mountain showing a sharp summit, 3,754 feet (1,144ᵐ3) high, when seen from westward and north-westward.

Chart 3128, plan of Laikang and Malasoro bays.

Bontomanai, about 5½ miles west-south-westward of Maja, has a sharp summit, 2,992 feet (912ᵐ0) high, when seen from south-westward only. Baranning and Dongolo, about 1¼ and 3 miles, respectively, southward of Bontomanai, are crater-shaped from this direction. Tjinaloe (Chinalu), about 2½ miles south-westward of Dongolo, is an isolated hill covered alternately with light green reeds and dark woods. Boeloe Pinka (Bulu Pingka), about 3 miles eastward of Dongolo, has steep slopes and a rugged outline; from southward and south-eastward it shows two deep, vertical clefts in the summit. Batoe Djawia (Batu Jawia), about 3 miles south-south-westward of Boeloe Pinka, appears from westward as a dark, isolated wood on a ridge covered with light-green reeds; Siboekang (Sirukang), nearly 2 miles southward of Batoe Djawia, is a round hill thickly wooded with dark trees; it may be mistaken for Soeka (Sukang), about 2 miles eastward, which it much resembles. *See* views facing pages 416, 417.

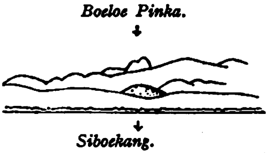
Malasoro baai.—Malasoro baai is entered between Ujong Kajoeleleng (Kayuleleng) and Ujong Mangasa (Malasoro), situated 12 and 7½ miles, respectively, east-south-eastward of Ujong Laikang. Ujong Kajoeleleng should not be approached within 1½ miles, as the depths southward and westward of it are very irregular. Liboekang (Malasoro) is an islet on the western side of the entrance and is fringed by a wide reef; from the opposite side of the entrance, near Kaloempang (Kalum-

Charts 941b, 1263, 2759a.

Chart 3128, plan of Laikang and Malasoro bays.

pang) village, the coastal reef dries out for three-quarters of a mile, with shoal water for a further quarter of a mile outside. Ujong Lompo, at the head of the bay, is a fairly prominent, rocky point; a steep-to rock, which dries, lies about 4 cables south-westward of this point.

Bojong Tjinnong (Chinnong), a hill, 375 feet ($114^{m}3$) high, with two white patches on it, is situated on the northern shore of the bay, about 1½ miles eastward of Ujong Lompo (*Lat. 5° 38′ S., Long. 119° 37′ E.*). A good mark for entering the bay is the summit of Boeloe Pinka in line with the wooded hill Siboekang, bearing 021°, and thence steering for the white patches on Bojong Tjinnong when they bear 048°. The best landing place is near Ujong Batoe (Batu), on the eastern shore of the bay.



Boeloe Pinka in line with Siboekang, bearing 021°.

(*Original dated* 1931.)

Laikang baai.—Laikang baai is entered between Ujong Kasi Matimpowa, about 2¼ miles north-westward of Ujong Mangasa, and Ujong Pépé, about 4 miles farther in the same direction; both entrance points are low and sandy and fringed by a reef, which dries. A bank, with a least depth of 8 feet ($2^{m}4$) over it, extends about 1½ miles westward from Ujong Kasi Matimpowa, and a bank, with a depth of 4 fathoms ($7^{m}3$) at its outer end, extends about one mile east-south-eastward from Ujong Pépé. Off the northern shore are four stony patches, which partly dry, surrounded by sand. In the north-western part are two shallow inlets, named Bangkoala (Bangkala) baai and Liballoe (Liballu) baai. Ujong Poentondo (Puntondo), the southern entrance of the latter, is low and thickly covered with dark trees.

Near the northern shore are three hills covered with dark trees; Laboe Tjinri (Labu Chinri), the eastern of these, is less noticeable than the other two. On the eastern side of the bay is a lagoon named Tamparang Kéké, which dries at low water. Sungei Aloe (Allu) flows out on the northern side of the entrance to this lagoon, and Djene Aloe, the principal settlement in the bay, stands one mile up the river.

Bontomanai in line with Karampoeang (Karampuwang), the north-western of the three wooded hills at the head of the bay, bearing 038°, or the same mountain in line with Laboe Tjinri, bearing 034°, leads clear of the shoals at the entrance. Good anchorage can be obtained either north-eastward or south-eastward of Ujong Poentondo.

Chart 1293.

Coast.—Ujong Laikang is not prominent, but Ujong Baroegaja (Barojaja), about 2¼ miles north-westward, may be identified by two dark rocks which show up well against the sandy shore. Ujong Djambatang I Meong (Chambataimeong), 2¼ miles northward of Ujong Baroegaja, has higher trees on it than elsewhere in the vicinity; Batu Galingang, a rock awash, lies close off this point.

Straat Tana Keke.—Dangers.—Beacon.—Straat Tana Keke lies between the Celebes coast between Ujong Djambatang I Meong and Ujong Parapa, 8½ miles north-north-westward, on the east, and Tana Keke, on the west. In the fairway there are depths of from 6 to 16 fathoms ($11^{m}0$ to $29^{m}3$). Straat Tana Keke is the usual passage,

Charts 2637, 941b, 1263, 2759a.

Chart 1293.

by day, for vessels proceeding to and from the Flores sea or from the eastern side of Celebes by the Southern channel to Makasser; at night the channel between Satanga and Dajang Dajangan (*see* below) is preferable.

Taka Luwara, a small sand and coral patch, with a depth of 3¾ fathoms (6^{m}9) over it, lies off the southern entrance of the strait and about 5 miles south-westward of Ujong Djambatang I Meong. Manrantoesang (Manrantusang), with a depth of 4½ fathoms (8^{m}2) over it, lies 3¾ miles westward of the same point; a similar patch lies about half a mile southward of Manrantoesang, and half a mile farther southward is a 3¾-fathom (6^{m}9) patch. All these shoals can be passed on either side; they are not marked by discoloration.

Malambeang (Malamuang), on the eastern side of the northern entrance to Straat Tana Keke and 2 miles southward of Ujong Parapa (*Lat. 5° 26′ S., Long. 119° 22′ E.*), is a shoal, with a least depth of 1¼ fathoms (2^{m}3) over it, and there are numerous smaller ones around it.

A black beacon, surmounted by a cone, stands on the edge of the reef extending from the eastern side of Tana Keke.

Tana Keke and adjacent islands.—Light.—Tana Keke is a low island covered in parts with high trees, and there is an extensive growth of shrubs on the coastal reef, which dries, so that the points of the island are difficult to determine and should not be used for bearings; the island can usually be seen from a distance of about 10 miles. The villages Kaloekoeang (Kalukuang), on the south-western side, and Tompotana, on the eastern side, are hidden by coconut trees. The fringing reef is plainly marked by discoloration when covered.

Baoeloewang (Bauluwang), 1¾ miles off the north-western side of Tana Keke, has a village on the north-eastern side; the passage between these two islands has been only partly examined and should not be used. Satanga, separated from the northern side of Boeloewang by a narrow, shoal passage, has a village and some high coconut trees in the northern part. *See* view facing page 417.

Dajang Dajangan, about 2¾ miles north-north-westward of Satanga, is almost entirely fringed by a steep-to reef which dries, extending from 2 to 3 cables from the southern and western sides. The channel between these two islands is frequently used by vessels proceeding to and from Makasser at night. *See* view facing this page.

A light is exhibited, at an elevation of 102 feet (31^{m}1), from a white iron framework structure, 98 feet (29^{m}9) in height, situated on the south-eastern side of Dajang Dajangan.

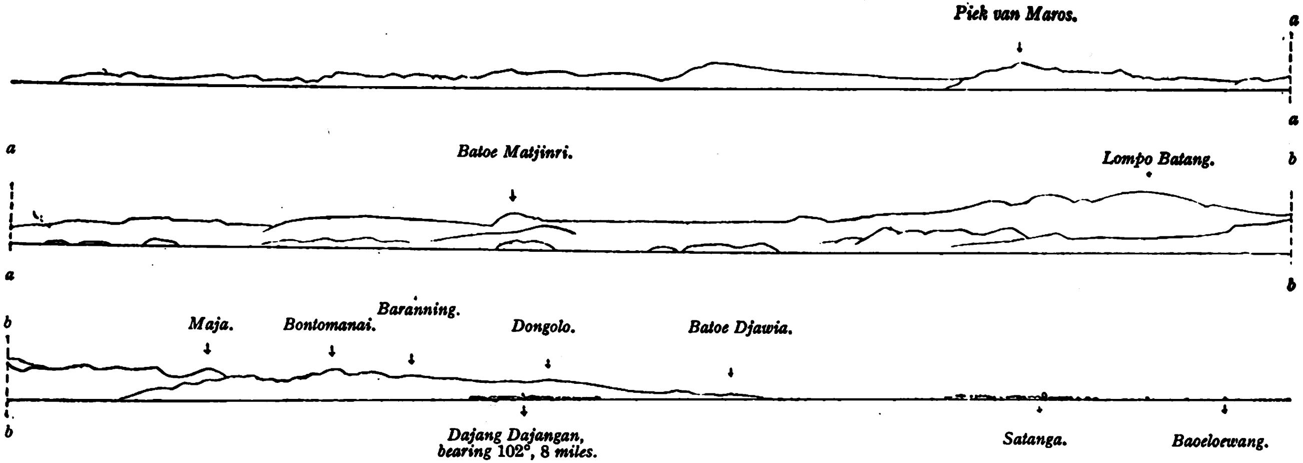
Tidal streams.—The tidal streams in Straat Tana Keke set in the general direction of the fairway, and are sometimes very strong. In the channel between Satanga and Dajang Dajangan they set in a general northerly and southerly direction, and are weak in the vicinity of Batoena Garoembang (Batuna Garumbang).

Dangers westward of Tana Keke.—Gosseiia, the westernmost danger, is an extensive bank having a large area with depths of under 5 fathoms (9^{m}1); the least depth, 2½ fathoms (4^{m}6), lies about 11½ miles westward of Dajang Dajangan and is generally marked by discoloration.

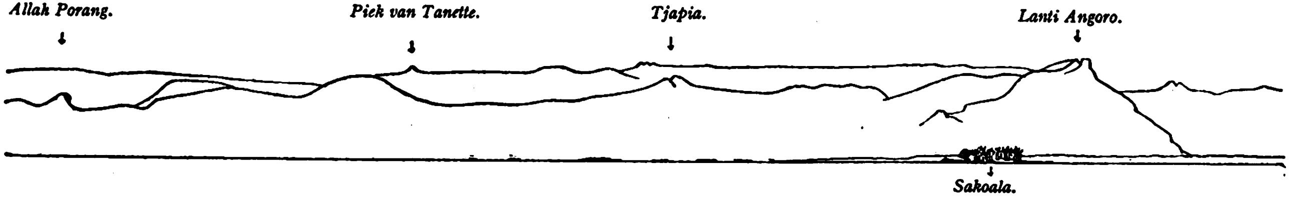
Ponto Pontowang, nearly 9 miles west-south-westward of Dajang Dajangan, is a small shoal, with a least depth of 3¼ fathoms (5^{m}9) over it, not marked by discoloration.

Charts 2637, 941b, 1263, 2759a.

To face page 422.



View, in three parts, of south-west coast of Celebes, from westward of Dajang Dajangan.
(*Original dated* 1931.)


Allah Porang.
Piek van Tanette.
Tjapia.
Lanti Angoro.
Sakoala.

West coast of Celebes. Northern channel to Makasser.
(*Original dated* 1931.)

Chart 1293.

Batoena Garoëmbang, with a depth of 4¼ fathoms (7^m8) over it, lies nearly 3 miles west-south-westward of Dajang Dajangan.

Taka Patappa, with a depth of 5½ fathoms (10^m1) over it, lies about 8½ miles westward of Tana Keke and at the southern end of an extensive bank, with depths of less than 10 fathoms (18^m3) over it. Taka Dange lies about 4 miles south-westward of Tana Keke, and has a least depth of 6 fathoms (11^m0) over it.

APPROACHES TO MAKASSER.—Channels.—Reede Makasser (page 425) can be approached by the Southern channel and by three channels through Spermonde archipel, namely: the Western channel (page 428), Hoven channel (page 431), and the Northern channel (page 433). There is also a swept channel (page 424), marked by buoys, entered about 3 miles westward of the northern extremity of Bone Malonjo.

Southern channel. — Dangers. — Buoys. — Light. — The southern approach to Makasser comprises the wide channel clear of dangers leading northward of Dajang Dajangan (*Lat. 5° 24′ S., Long. 119° 12′ E.*) and Straat Tana Keke to Reede Makasser, bounded on the west by the line joining Dajang Dajangan, Koedingareng Lompo and Samalona, and on the east by the coast of Celebes. This channel can be entered from three directions, namely:—From westward, passing northward of Gosseiia and Dajang Dajangan; from south-westward, passing between Dajang Dajangan and Satanga; and from southward through Straat Tana Keke.

The passage northward of Gosseiia and Dajang Dajangan is generally used by large vessels, both by day and night, proceeding to and from Makasser by the channel between Doang Doangan and Laars banks, described on page 418. The main direction of the current in this passage is west-north-west or east-south-east, according to the monsoon, although a current setting northward or southward across the passage has been frequently reported.

Between Dewakang besar (page 419) and Dajang Dajangan a south-going current with a rate of 2 knots is sometimes experienced, even during the strength of the South-east monsoon. A vessel approaching from westward should obtain a bearing of Dajang Dajangan, which is usually visible from a distance of 10 miles, as soon as possible.

Bone Pinjing, with a least depth of 3¼ fathoms (5^m9) over it, lies about 5 miles northward of Dajang Dajangan. Bone Luere, with a least depth of 6 fathoms (11^m0) over it, lies about 6½ miles northward of Dajang Dajangan. Bone Kaluku, about 9 miles northward of Dajang Dajangan, has a least depth of 4¼ fathoms (7^m8) over it. Bone Pamalompo and Bone Pamakeke, 2¼ and 3 miles, respectively, northward of Bone Kaluku, each has a depth of 4¼ fathoms (7^m8) over it.

Chart 2662, plan of Reede Makasser.

Koedingareng (Kudingareng) Lompo or Groot Hertenbeest, about 15 miles northward of Dajang Dajangan, although low, has some high trees on its middle part, and is visible about 14 miles in clear weather; it is one of the most thickly populated islands of the Spermonde archipel. The fringing reef is narrow on the eastern side, but extends about 8 cables southward, with two sandbanks, which dry, near the edge; there is a small prau harbour, which mostly dries, on the eastern side.

Charts 2637, 941b, 1263, 2759a.

Chart 2662, plan of Reede Makasser.

Samalona, about 4¾ miles east-north-eastward of Koedingareng Lompo, is a low islet thickly covered with tall coconut trees, visible about 12 miles; the fringing reef is narrow on the eastern side, but extends about 3 cables westward and north-westward.

Taka Bako, about one mile east-south-eastward of Samalona, is a small reef, with a depth of 3 feet ($0^{m}9$) over it, and is seldom marked by discoloration.

Charts 2662, plan of Reede Makasser, 1293.

The Celebes coast between Ujong Parapa (*Lat. 5° 25′ S., Long. 119° 22′ E.*) and Mariso, about 16½ miles northward, has few noticeable features. Sanrabengi, an islet covered with coconut trees, lies on a projecting part of the coastal reef about 6 miles northward of Ujong Parapa, and is noticeable from northward or southward, but from westward it does not stand out very clearly against the monotonously wooded coast behind. There are numerous villages, and the mouths of several streams, along the coast between Sanrabengi and the delta of Djene Bérang, nearly 10 miles north-north-eastward.

Chart 2662, plan of Reede Makasser.

Taka Boeboejang, a rocky patch with a depth of 3¼ fathoms ($5^{m}9$) over it, lies about 1¾ miles south-westward of the delta of Djene Berang. Taka Pindjing, about 1½ miles west-south-westward of Mariso light-structure, and about 4 cables offshore, has a depth of 6 feet ($1^{m}8$) over it. Owing to target practice the area between Taka Boeboejang, Taka Pindjing and the coast is unsafe.

A light is exhibited, at an elevation of 43 feet ($13^{m}1$), from a white iron framework structure, 46 feet ($14^{m}0$) in height, situated near the beach at Mariso.

Charts 2662, plan of Reede Makasser, 1293.

Swept channel.—Dangers.—Buoyage.—A swept channel leads northward of Bone Malonjo, a shoal with a least depth of 5 fathoms ($9^{m}1$) over it, situated about 11½ miles north-westward of Dajang Dajangan, thence between Bone Pamalompo and Bone Pamakeke, on the south, and Bone Pute (page 419), on the north, thence westward and northward of Koedingareng Lompo, thence northward of Samalona, and thence northward of the breakwater on Klein Lae Lae (page 425).

Chart 1293.

A light-buoy, painted in red and black bands, exhibiting a *white flashing* light *every five seconds*, is moored at the entrance to the channel about 3¼ miles west-north-westward of the northern extremity of Bone Malonjo. A white can buoy, surmounted by a white ball, is moored on the northern side of Bone Malonjo. A white conical buoy, No. 2, surmounted by a ball, is moored about 2 miles east-north-eastward of the northern end of Bone Malonjo.

A light-buoy, painted in black and red bands, exhibiting a *white flashing* light *every five seconds*, is moored on the northern side of the channel, at the southern end of Bone Pute.

A white conical buoy, No. 3, is moored about half a mile north-north-westward of Koedingareng Lompo, and marks the southern side of the channel.

Chart 2662, plan of Reede Makasser.

A light-buoy, painted in black and red bands, exhibiting a *white flashing* light *every sixteen seconds*, is moored on the southern

Charts 2637, 941b, 1263, 2759a.

Chart 2662, plan of Reede Makasser.

side of the channel, about 1½ miles northward of Koedingareng Lompo.

A black can buoy, surmounted by a truncated cone, is moored on the northern side of the channel, about 5 cables southward of Koedingareng Keke. This island, also known as Klein Hertenbeest, lies about 2¾ miles north-north-eastward of Koedingareng Lompo ; it consists of two sandbanks, the northern being covered with low brushwood and visible about 6 miles ; the fringing reef is steep-to, and extends about 3 cables from the south-western side.

A white conical buoy, surmounted by a ball, equipped with a reflector, is moored about 2¼ cables north-north-westward of Samalona (*Lat. 5° 08′ S., Long. 119° 21′ E.*), on the southern side of the channel. A white conical buoy, surmounted by a ball, is moored about 4¾ cables west-south-westward of the northern extremity of the breakwater on Klein Lae Lae.

REEDE MAKASSER.—Reede Makasser lies between the town of Makasser, situated on the coast close northward of Mariso, and a line of coral reefs about half a mile offshore. It comprises the area southward of lat. 5° 06′ S., bounded by a line drawn from Mariso light-structure to the light-beacon situated on Groot Lae Lae, and thence, through the centre of the islet on Gosong Boni, to the parallel of lat. 5° 06′ S. The depths vary from 7 to 10 fathoms (12^{m}8 to 18^{m}3). The roadstead is usually approached by the Southern channel, but, in 1948, the swept channel was used. The roadstead is only partially sheltered by the reefs and breakwaters, and strong winds from seaward may raise a considerable sea in the anchorage and alongside the quays ; vessels with high superstructure should always have a second anchor ready, and take all necessary precaution against dragging. Should the Harbour master consider it necessary, vessels must moor.

Dangers. — Breakwaters. — Lights. — Beacons. — Buoyage. —Groot Lae Lae, the southernmost danger, partly dries, and has an artificially formed island on it, prolonged northward by a breakwater.

A light is exhibited, at an elevation of 43 feet (13^{m}1), from a white iron framework structure, 26 feet (7^{m}9) in height, situated on the southern part of Groot Lae Lae.

Klein Lae Lae, about one mile north-north-eastward of Groot Lae Lae, is a bare patch of sand, surrounded by a reef which only dries near its eastern end at the lowest tides ; a breakwater is built over the surrounding reef.

Hoofd rif, with a least depth of 1½ fathoms (2^{m}7) over it, lies about 2½ cables southward of Klein Lae Lae. A light-buoy, painted black, exhibiting an occasional *red fixed* light, is moored on the southern side of Hoofd rif. A shoal, with a least depth of 4¼ fathoms (7^{m}8) over it, lies 3 cables south-eastward of the southern extremity of the breakwater on Klein Lae Lae.

A white beacon, from which a light is occasionally exhibited, surmounted by a ball, stands on the northern edge of Klein Lae Lae reef, and a beacon, surmounted by a black truncated cone above a white ball, stands on the eastern extremity of this reef.

Gosong Boni is a small islet, with some tall conspicuous casuarina trees on its eastern part ; there are some barracks on this islet, and a small pier extends from the eastern side. There is a passage about

Charts 1293, 2637, 941b, 1263, 2759a.

Chart 2662, plan of Reede Makasser.

one cable wide, with depths of from 9 to 11 fathoms (16^m5 to 20^m1), between Klein Lae Lae and Gosong Boni. A black beacon, from which a light is occasionally exhibited, surmounted by a cone, stands on the south-western extremity of the shoal water surrounding Gosong Boni. This beacon, together with the two marking the edge of Klein Lae Lae reef, mark the passage between Klein Lae Lae and Gosong Boni.

A black can buoy is moored about 2½ cables southward of Gosong Boni.

A black beacon, surmounted by a cone, marks a detached 5-foot (1^m5) patch lying about 3½ cables north-westward of Gosong Boni.

Gosong Panjoa (*Lat. 5° 07′ S., Long. 119° 24′ E.*) and Gosong Trabanoesoe, at the northern end of the roadstead, partly dry, and each has a white sand cay near its eastern edge. A rock awash, lies on the western part of the shoal surrounding Gosong Panjoa.

All these reefs are surrounded by steep-to banks, extending a considerable distance from their western sides, and partly drying in the month of July, when the water level is at its lowest.

Charts 2662, plan of Reede Makasser, 1293.

Land and sea breezes.—In the approach to Makasser, during the east monsoon, the sea breeze sets in at about 1000, and often blows with considerable strength from south-south-west to south-west. The land wind is less strong, and comes off between 1800 and 1900, from south-south-east to east, and is often strongest about sunrise. Northward of Takalar, on the eastern side of Straat Tana Keke, the wind force is less than that on the western part of the south coast of Celebes; the southerly wind is known as " Timur." Makasser is approximately at the boundary of the dry easterly winds known as " Brubu," which at times blow down from the mountains; they are most frequent and characteristic at Maros (chart 2637), about 12 miles north-eastward of Makasser, but they may dominate the sea breeze and extend 4 or 5 miles offshore, setting in unexpectedly and with gusts, accompanied by hazy weather.

In the west monsoon, which sets in about December, with squalls and much rain, the wind is from west to west-north-west, the land breeze is seldom felt, and then only in a direction southward of east.

At the outer edge of the flat near Langkai an island about 20 miles west-north-westward of Makasser, the sea breeze during the east monsoon will blow from south to south-west for a short time each day, then turning again towards south-south-east and south-east.

Chart 2662, plan of Reede Makasser.

Currents and tidal streams.—The tidal streams in Reede Makasser have only a slight influence on the monsoon current. From four days' observations towards the end of March, during the North-west monsoon, it was found that, on an average, the north-going stream ran from 4h. 30m. before high water to 0h. 25m. before high water, and the south-going stream from 0h. 25m. before high water to 5h. 00m. before the next following high water; the duration of the north-going stream against the southerly current being thus only just over half that of the south-going stream at this period of the year. The rate of the south-going stream was from one to 1½ knots, whilst that of the north-going stream was very weak.

The monsoon current, caused by the prevailing wind in the open part of Macassar strait, seldom exceeds a rate of one knot; in the strength

Charts 2637, 941b, 1263, 2759a.

of the North-west monsoon this current generally runs southward in the roadstead, and northward in the South-east monsoon. When Kali Djene Bérang is in flood, owing to heavy rains, and sometimes with strong winds from a direction southward of west, there is a north-going current in the roadstead, whilst outside the reefs the current is setting southward.

Harbour works.—Light.—The Naval pier, close northward of Fort Rotterdam (*Lat. 5° 08′ S., Long. 119° 24′ E.*), at the southern end of the town of Makasser, serves as a shelter and a landing place for boats, and has a depth of 11 feet (3^{m}4) alongside; vessels lying in the roadstead can signal to their boats through the look-out station on this pier. Wilhelmina wharf, north-eastward of the Naval pier, is 1,624 feet (495^{m}0) long, and, in 1948, had a least depth of 20½ feet (6^{m}3) alongside; it is used by vessels which have no other berth assigned to them, but there are no appliances for working cargo. A prau harbour, with a depth of 9 feet (2^{m}7) alongside the quays, lies at the northern end of Wilhelmina wharf. Juliana quay, the northernmost quay, is 4,462 feet (1,360^{m}0) long, with a least depth of 24½ feet (7^{m}5) alongside, and is used by the regular steamship lines; there is a railway to Takalar, about 19 miles southward of Makasser, with sidings on this quay. The northern end of Juliana quay is the coaling quay. Vessels berthing at the coaling quay must bear in mind that the north-going stream in the road sets strongly in here, whilst the south-going stream sets out. A pier, about 200 feet (61^{m}0) long, with a depth of 27½ feet (8^{m}4) alongside, for petroleum vessels, extends from the northern end of Juliana quay and farther north-eastward is a basin for small vessels. Prins Hendrik quay, 262 feet (79^{m}9) long, has a depth of 14 feet (4^{m}3) alongside.

With strong winds from seaward there is sometimes a considerable sea against the quays, especially at Juliana quay, which is only slightly protected by the breakwater; large vessels, and those with high superstructure, are advised to let go an anchor at some distance from the quays when proceeding to their berths, so as to assist in holding off the fore part of the vessels. There are several mooring and warping buoys off the quays. During the North-west monsoon vessels are required to berth 20 feet (6^{m}1) off the quays by means of the warping buoys. The harbour office is situated at the southern end of Juliana quay.

A light is exhibited, at an elevation of 63 feet (19^{m}2), from a post, situated about three-quarters of a mile north-north-eastward of Tanjong Pandan.

Pilotage.—Pilotage is compulsory for merchant vessels, with a few exceptions given in the Netherlands Pilotage regulations. The pilots meet vessels in motor boats, which display a blue flag with a white star. Vessels approaching by the Southern channel obtain the pilot just outside Groot Lae Lae; by the Hoven channel, just outside the western entrance to the roadstead, between Klein Lae Lae and Gosong Boni; and by the Northern channel, just outside the northern entrance to the roadstead, between Gosong Trabanoesoe and the Celebes coast.

The pilot look-out station is situated on the Naval pier.

For Pilotage signals *see* page 11.

Makasser.—Makasser is the capital of the Government of Celebes, and is an important trading place for the products of Celebes and the

Charts 1293, 2637, 941b, 1263, 2759a.

Chart 2662, plan of Reede Makasser.

Moluccas; the Governor's house is in the Hoogepad, a broad avenue planted with trees. Fort Rotterdam, in the southern part of the town, has a noticeable, disused light-tower, about 35 feet ($10^{m}7$) in height, the upper half red and the lower white, on its western side. The land in the vicinity of Makasser is low and swampy, although the town is considered to be healthy. The population in 1930 was 86,662, including 3,600 Europeans.

Harbour facilities.—Large supplies of coal are kept in stock; coaling is carried out by native labour with baskets at the rate of 50 to 60 tons per hour. Fuel oil is taken in alongside. Fresh provisions are plentiful; water, fit for drinking and boiler purposes, is laid on to the wharves.

The Military hospital, which has about 300 beds and is divided into a European and native block, admits seamen.

Small repairs to vessels can be carried out in the workshops of the Koninklijke Paketvaart Maatschappij. A fire engine is maintained afloat.

Communication.—**Radio station.**—The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij and other steamship lines. The town is connected to the general telegraph system.

There is a radio station, situated about 4 cables south-eastward of Mariso (*Lat. 5° 09′ S., Long. 119° 25′ E.*). *See* page 10.

Trade.—The principal exports are coffee, gum, shells, spices, rattan, tortoiseshell, tripang and copra; the chief imports are cotton and woollen goods, hardware, glassware, tobacco, groceries, wines and spirits.

Chart 2637.

WESTERN AND NORTHERN CHANNELS TO MAKASSER.—**Spermonde archipel.**—Spermonde archipel is an extensive area encumbered with coral islands, rocks, and banks lying on a flat extending, at its widest part, about 35 miles from the southern part of the west coast of Celebes. A great portion of the outer edge is formed by a raised ridge of coral, which slopes abruptly into depths of over 100 fathoms ($182^{m}9$), and, under favourable conditions, is generally plainly marked by discoloration; the current along this edge sometimes causes heavy ripples, often having the appearance of breakers.

Vessels passing through Macassar strait proceed outside the archipelago, sighting Kapoposang (*see* page 429), the westernmost islet, 37 miles north-westward of Makasser and passing either side of Taka Bakang (page 420). All the islets in the archipelago are low and more or less wooded, most of them being planted with coconut trees; many of them are inhabited. Drinking water is obtained from wells, but is brackish except on Balang Tjadi (page 436) and Saboeton (page 436). The islets are only of importance because of the assistance they afford in navigating the channels to Makasser through the archipelago; for details, *see* the description of these channels.

Caution.—The formation of the numerous islets and reefs in Spermonde archipel is not constant; reefs grow into islets, and islets disappear and become reefs. Shoals that were of no danger to shipping during the survey, which was carried out many years ago, may have since become dangerous; without local knowledge, therefore, vessels

Charts 941b, 1263, 2759a.

Chart 2637.

should adhere strictly to the swept channel (*see* page 424) through the archipelago.

Kapoposang.—Light.—Owing to its position at the outer edge of Spermonde archipel, Kapoposang is important to vessels proceeding through the eastern side of Macassar strait outside the archipelago, and the light on this island is mainly intended for such purpose. Although low, the island is covered with high trees, and in clear weather is visible about 10 miles; by day the light-structure is not very noticeable, as it only just projects above the trees. The trees in the narrow, middle part of the island are low.

A light (*Lat. 4° 42′ S., Long. 18° 57′ E.*) is exhibited, at an elevation of 105 feet (32^{m}0), from a white iron framework structure, 108 feet (32^{m}9) in height, on the western extremity of Kapoposang.

Charts 3044, 2637.

North-western part of Spermonde archipel.—This area of Spermonde archipel, lying between the parallels of Kapoposang and Lappo Kri Kri (page 434), and westward of the Northern channel to Makasser, should be avoided by vessels. The outer edge has not been thoroughly examined, and the lack of good landmarks make navigation dangerous in this vicinity.

Suranti, about 11 miles east-north-eastward of Kapoposang, with the intervening islets, are described with Hoven channel on page 431. Gosong Tuara, 4 miles north-eastward of Suranti, is a sandbank which dries; the ridge along the 100-fathom (182^{m}9) line can be crossed between Suranti and Gosong Tuara, but northward of the latter, as far as Taka Bulango, a reef, which dries, about 15 miles northward of Gosong Tuara, there is no passage.

Djangang Djangangan (Jangang Jangangan), about 3½ miles north-eastward of Gosong Tuara, is covered with brushwood and a few low trees. Gosong Karangan, 7 miles northward of Djangang Djangangan, is the northernmost islet in this part of the archipelago, but is little more than a sand cay.

Chart 2637.

Winds.—In Spermonde archipel in July, August, and September, the "Brubu," or mountain wind, is met with. The approach of these squalls, which usually come in the forenoon, is generally marked by a heavy sky and the land becoming very indistinct. Frequently the "Brubu" sets in unexpectedly, the only sign of its arrival being a rippling of the water. In the southern part of the archipelago the hazy south-east wind is called "Tongara."

Chart 1293.

Western channel to Makasser.—Lanjoekang (Lanyukang), covered with coconut trees and visible about 11 miles, lies close within the 100-fathom (182^{m}9) line and about 22 miles west-north-westward of Makasser; vessels taking the Western channel to Makasser pass either northward or southward of this island.

There is practically no tidal stream, but a current, caused by the prevailing winds, frequently sets across the main direction of the channel, and the remarks on the monsoon current in Reede Makasser (page 426) to a great extent apply here; the rate seldom exceeds one knot. It must not be taken for granted that the current is setting across the entire length of the channel at any given period; it does not follow, therefore, that if the current is setting either northward or

Charts 941b, 1263, 2759a.

southward at the entrance, it will be in the same direction farther up the channel.

Caution.—Owing to the lack of good leading marks the channels northward and southward of Lanjoekang (*Lat. 4° 59′ S., Long. 119° 04′ E.*), giving access to the Western channel, must be used with caution, particularly as the current sets across them; unless the reefs are plainly visible, vessels exceeding a draught of 16 feet ($4^{m}9$) are advised not to use these channels; eastward of Lanjoekang there is deep water throughout the Western channel, provided the vessel adheres to the route shown on chart 1293 and described in the directions.

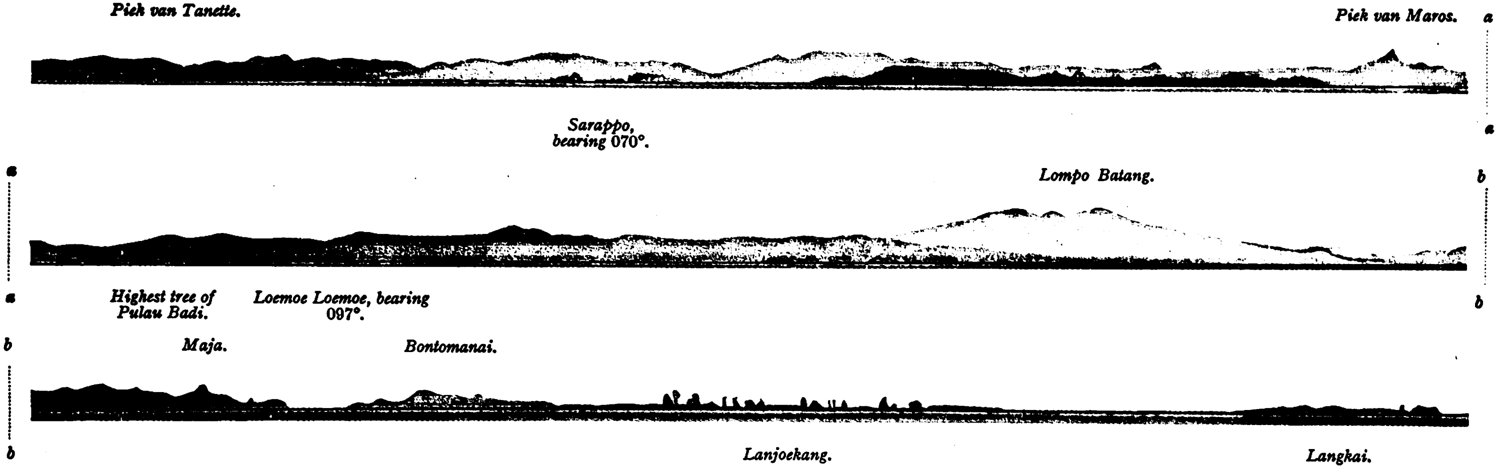
Directions.—Dangers.—The navigation of the Western channel to Makasser, when once inside the entrance, is not difficult as the islets on either side form fairly good landmarks, and careful sounding gives warning of the approach of the vessel to some of the dangers in the western part of the route. In the eastern part Koedingareng Lompo, Koedingareng Keke, and Samalona, which have been described on pages 423–425, are very useful landmarks. The outer edge of the bank, on which Spermonde archipel lies, is generally marked by discoloration and ripplings. Langkai, a thickly wooded island about 3 miles southward of Lanjoekang, with higher trees on the western side than on the eastern, should be identified before entering the Western channel.

The channel northward of Lanjoekang has the greatest depth in it, but there is no good leading mark and vessels must be guided through it by eye; Sarappo, an islet, which has a noticeable tree in about the middle, lies about 12½ miles north-eastward of Lanjoekang, and, if visible, may be some guide and if kept, bearing about 070°, leads through in the greatest depth (*see* view facing this page). When the western extremity of Lanjoekang bears 180°, course may be gradually altered southward so as to pass about 1½ miles eastward of this island. When Bontomanai (chart 2637) bears 131°, and is just open north-eastward of Koedingareng Lompo, the vessel should steer on this mark, which leads to a position about 3 cables northward of Batunai Balo, a reef lying about 7½ miles south-eastward of Lanjoekang, with a least depth of 6 fathoms ($11^{m}0$) over it; in case Bontomanai cannot be seen, the north-eastern end of Lanjoekang can be kept astern, bearing 311°, or the northern end of Koedingareng Lompo, bearing 131°.

If taking the channel southward of Lanjoekang the following mark, although very indistinct, may sometimes be of use: the highest tree on Badi in line with Loemoe Loemoe (Lumu Lumu), bearing 084°. Badi is an islet lying about 12½ miles eastward of Lanjoekang, and, in clear weather, the tree comes in sight as a small speck above the horizon, about one mile outside the bank of Spermonde archipel; this tree open just northward of Loemoe Loemoe marks the northern side of the channel, and open just southward of the same islet marks the southern side. Loemoe Loemoe (*Lat. 4° 59′ S., Long. 119° 13′ E.*), about 8 miles eastward of Lanjoekang, is a wooded islet with a couple of higher trees on the north-western side, and is visible 14 miles in clear weather. With exceptionally good visibility Piek van Maros (chart 2637), about 25 miles north-eastward of Makasser, will be seen in the distance almost on the above alignment. When the western extremity of Langkai bears 180°, the vessel may steer for Bontomanai, bearing 131°, as directed above.

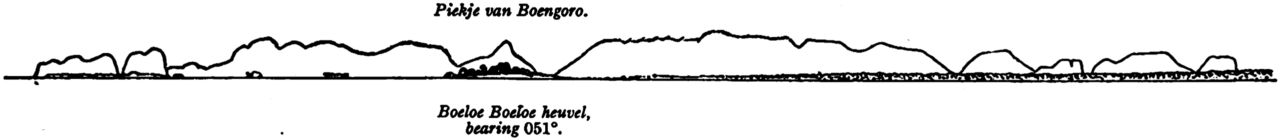
When the high tree on Sarappo is in line with the eastern side of

To face page 430.



View, in three parts, of Western channel to Makasser, from the channel northward of Lanjoekang.

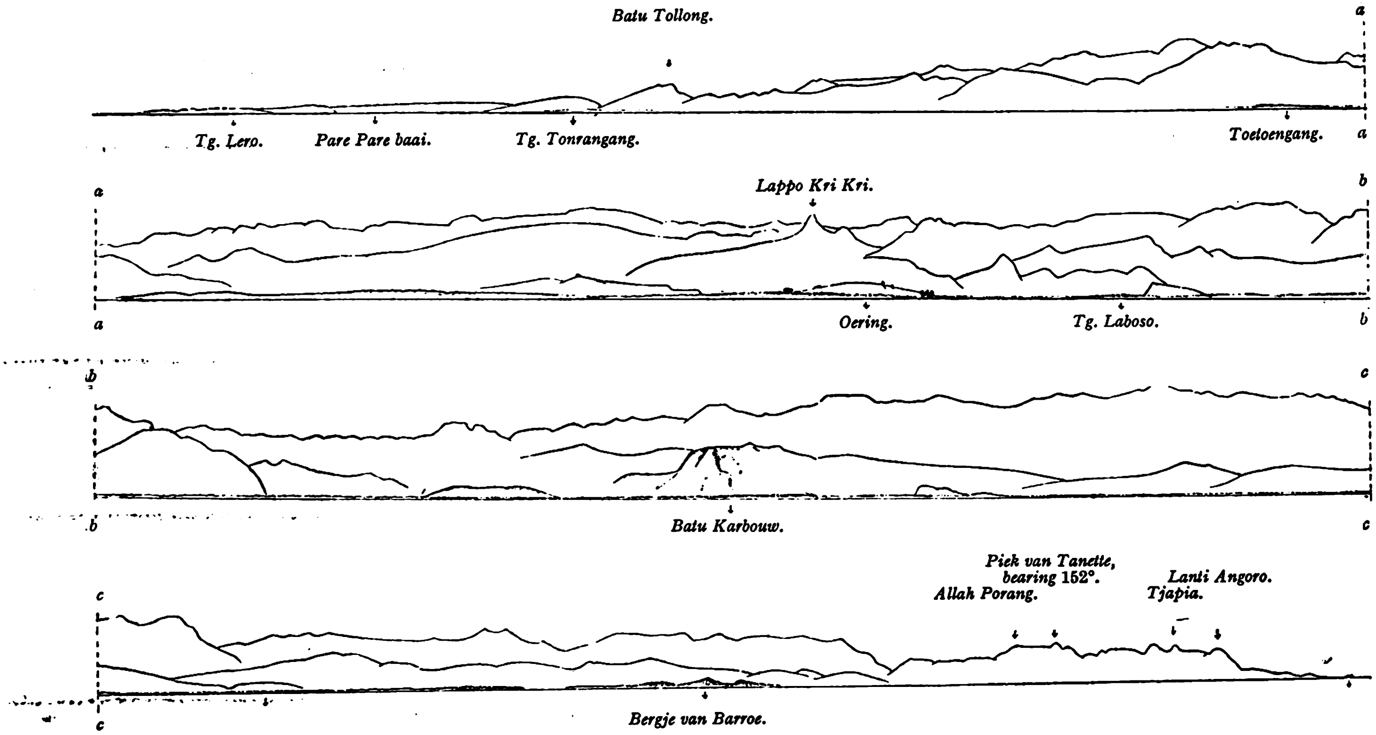
(*Original dated* 1903.)



Northern channel to Makasser. Piekje van Boengoro in line with Boeloe Boeloe heuvel.

(*Original dated* 1931.)

To face page 431.



View, in four parts, of entrance to Northern channel to Makasser.

(*Original dated* 1931.)

Chart 1293.

Loemoe Loemoe, bearing 028°, the vessel should bring the northern side of Samalona in line with the northern side of Koedingareng Keke, bearing 110°, thus passing between the two reefs Batunai Balo and Seborong; if this alignment cannot be seen plainly, Langkai can be kept astern, bearing 290°.

Charts 2662, 1293.

When Koedingareng Lompo bears 142° the vessel should alter course to 124°, passing about 4 cables south-westward of the steep-to reef Kapodasang; when the north-western side of Barang Keke, a high islet wooded with dark trees, lying about 2¼ miles north-eastward of Koedingareng Keke, is in line with the south-eastern side of the latter islet, bearing 051°, and the eastern side of Koedingareng Lompo bears about 189°, she should steer for Mariso light-structure, bearing about 104°, thence rounding the light-structure on Groot Lae Lae shoal so as to enter Reede Makasser by the southern entrance.

Vessels proceeding seaward from Reede Makasser by the Western channel can follow the directions just given in the reverse order. When steering to pass between Batunai Balo and Seborong, with the northern side of Samalona in line with the northern side of Koedingareng Keke, bearing 110°, astern, the latter islet, although closer, will disappear from view first, and this will occur when nearing Batunai Balo; Langkai (*Lat. 5° 02′ S., Long. 119° 06′ E.*) should, therefore, be kept ahead, bearing 290°.

Chart 2637.

Hoven channel to Makasser.—Hoven channel is entered southward of Kapoposang, which island, with the light-structure on it, is described on page 429. The remarks on the winds given on page 429, in the description of the Western channel, apply here also. The attention of the mariner is called to the caution on page 430.

The following islets lie just within the 100-fathom ($182^{m}9$) line at the entrance to Hoven channel:—Papandangang, 1¼ miles south-eastward of Kapoposang, is low, but, owing to the high trees on it, is visible 10 miles. Kondongbali lies about 4½ miles eastward of Papandangang and is similar to it; a long ridge, which dries in places, lies between these two islets. Kapoposang, Papandangang, and Kondongbali are inhabited. Tambakoeloe (Tambakulu), about one mile southward of Kondongbali, is covered with low shrubs. Pamangangang, about 3½ miles north-eastward of Kondongbali, is a sand cay covered with low shrubs; in the middle is a group of coconut trees, and a couple of casuarina trees stand on the eastern extremity. Suranti, about 2¼ miles north-north-eastward of Pamangangang, consists of two sandbanks which partly dry and have low brushwood on them; the area around Suranti has not been thoroughly examined.

There is a deep channel between the reefs fringing Tambakoeloe and Kondongbali; with careful navigation vessels can also pass eastward or westward of these two islets, over the ridge near the 100-fathom ($182^{m}9$) line. The bottom here is sometimes visible at a depth of 10 fathoms ($18^{m}3$). The islets and reefs adjacent to the remainder of Hoven channel, and the beacons marking them, are described in the directions for this channel.

Directions.—Dangers.—Beacons.—With a large scale chart the navigation of Hoven channel presents no difficulties to vessels of any

Charts 941b, 1263, 2759a.

Chart 2637.

size, as the channel has a least depth of 10 fathoms ($18^{m}3$), is wide and marked by beacons, whilst there are fairly good marks for fixing the vessel's position. The usual entrance channel for vessels of deep draught lies south-westward of Kapoposang; smaller vessels can also enter by the channel eastward of Papandangang.

To enter by the channel south-westward of Kapoposang, a vessel should bring the southern extremity of Kondongbali in line with the northern extremity of Papandangang, bearing about 089°, which leads between the reef extending nearly 1¾ miles west-south-westward from Kapoposang light-structure (*Lat. 4° 42′ S., Long. 118° 57′ E.*) and a ridge, with a least depth of 2 fathoms ($3^{m}7$) over it, lying near the 100-fathom ($182^{m}9$) line about 2¾ miles south-westward of Kapoposang light-structure. When the western extremity of Kapoposang bears 000° the vessel should alter course to about 112°, so as to pass southward of the reef fringing Papandangang and about midway between Tambakoeloe and Taka Luwar, a reef having a small sand cay on it lying about 3½ miles south-westward of Tambakoeloe; fishing praus are often seen near Taka Luwar, and it is always marked by surf. A reef, with a least depth of 5 feet ($1^{m}5$) over it, lies about one mile south-eastward of Tambakoeloe, and a rock, which dries, lies about 1½ miles eastward of the same islet.

A vessel with local knowledge entering by the channel eastward of Papandangang can pass about 2¾ cables eastward of the fringing reef extending from this islet, the outer edge of which is marked by a white beacon surmounted by a ball; a 4¾-fathom ($8^{m}7$) patch lies about half a mile eastward of this beacon. When navigating this passage, which has a least depth of 6 fathoms ($11^{m}0$) in it, Taka Luwar should be kept on the port bow, steering a southerly course. When the western extremity of Kapoposang is in line with the north-eastern side of Papandangang, bearing 306°, the vessel should keep this alignment on astern, until a sandbank, which dries, lying on the fringing reef extending about 8 cables north-westward from Tambakoeloe is in line with Pamangangang, bearing about 056°, when she should alter course to about 112°.

After entering from either of the channels just described, the vessel should continue steering 112° until Kondongbali is in line with Tambakoeloe, bearing 000°, when she should steer for Sarappo (page 430), bearing about 118°, which leads about 3 cables north-eastward of a 5-fathom ($9^{m}1$) patch lying 2¾ miles south-south-eastward of Tambakoeloe. This last course leads northward of Taka Tengah Tengah, a horseshoe-shaped reef, situated 8 miles south-eastward of Taka Luwar, and has a white beacon surmounted by a ball on its northern edge; this reef appears to be extending northward. When nearing this beacon the opening between Kondongbali and Tambakoeloe will bear 319°, and should be kept astern, bearing 319°, passing between Taka Tengah Tengah and a reef, with a depth of 1¾ fathoms ($3^{m}2$) over it, lying about 1½ miles east-north-eastward; the latter reef is marked by a black beacon surmounted by a cone. In this narrow part of the channel attention should be paid to the current, which may be setting across it. The trees on Lanjoekang and Langkai will be seen just above the horizon here, whilst Sarappo and Sarappo Keke, about 4½ miles northward, will afford additional marks for fixing the vessel's position.

Charts 941b, 1263, 2759a.

Chart 1293.

The vessel should continue steering 139° until eastward of Kasi, a reef, which partly dries, about 5½ miles westward of Sarappo, which is marked by a white beacon, surmounted by a ball, on its northern extremity; a 5-fathom (9^{m}1) patch lies about 2 miles eastward of this beacon and on the eastern side of the channel. Kondongbali and Tambakoeloe disappear from sight here, and, when Sarappo (*Lat. 4° 53′ S., Long. 119° 16′ E.*) bears 090°, course should be altered to 146° for a position about midway between Loemoe Loemoe and Badi (page 430). Three reefs lie on the eastern side of the channel, between Sarappo and Badi; the south-western of these, named Taka Poeloe (Pulu) Badi, is marked by a black beacon surmounted by a cone. There are also some reefs on the western side of the channel, between Kasi and Loemoe Loemoe.

When Lanjoekang is in line with Loemoe Loemoe, bearing 268°, the vessel should keep Samalona (page 424) in line with the south-western extremity of Barang Keke (page 431), bearing 150°; this course leads between Bone Tamboeng (Tambung), a high, sparsely wooded islet, 4½ miles southward of Badi, and Barang Lompo, a high, thickly wooded islet about 3 miles eastward of Bone Tamboeng, both of which are visible 14 miles in clear weather. A black beacon, surmounted by a cone, stands on the edge of the reef extending south-westward from Barang Lompo.

When the stone beacon on Barang Baringang (*see* page 437) is in line with the southern extremity of Barang Lompo, bearing 093°, or Bergje van Pateene (Mount Patine), near the Celebes coast about 7 miles north-eastward of Makasser, is in line with the southern extremity of Barang Lompo, bearing 092°, the vessel should alter course to 126°, passing between Barang Keke and Barang Lompo; when Barang Keke bears about 280° she should steer for the western entrance to Reede Makasser between Klein Lae Lae reef and Gosong Boni (chart 2662), with Bone Tamboeng bearing 304°, astern. Sometimes the wind and current conditions render it advisable to enter the roadstead by the southern entrance in preference to the western.

Vessels proceeding seaward from Reede Makasser by Hoven channel can follow the direction just given in the reverse order; they should keep a good look-out for Lanjoekang after passing between Bone Tamboeng and Barang Lompo, as this islet is a mark for the alteration of course to 326° when southward of the black beacon on Taka Poeloe Badi.

Charts 3044, 1293.

Northern channel to Makasser.—The Northern channel to Makasser runs in a general southerly direction at a distance of not less than 2½ miles from the west coast of Celebes, and is about 50 miles in length from its northern entrance, westward of Panikiang, to Reede Makasser; this channel is marked by beacons. The least depth, 3¼ fathoms (5^{m}9), is close northward of the Narrows of Banko Bankoang, an island lying about 21 miles northward of Makasser, and also southward of Barang Baringan, a reef about 4½ miles north-north-eastward of Makasser; elsewhere in the passage the depths are considerably greater.

Farther westward, in the area of Spermonde archipel between the southern part of the Northern channel and Hoven channel, several alternative routes were examined during the survey in 1900; two of

Charts 3044, 1293.

these are shown on chart 3044, but they are not marked by beacons, and, although the depths are greater, they are seldom used and are not recommended.

Monsoon current.—In general, the remarks on the monsoon current in Reede Makasser, given on page 426, apply to the Northern channel. As a rule, although it is not always the case, the North-west monsoon causes a south-going current, and the South-east monsoon a north-going current; except in the Narrows of Banko Bankoang (*Lat. 4° 47′ S., Long. 119° 27′ E.*) the rate seldom exceeds one knot.

In the large bight northward of Spermonde archipel, the direction of the current is always uncertain, so that care should be taken to ascertain the vessel's position before attempting to enter the Northern channel from northward. The remarks given below may be of assistance to mariners for this purpose.

Charts 3044, 2637.

Northern approach.—In addition to the uncertainty of the set of the current, the weather conditions add to the difficulty of making the northern entrance to the Northern channel. In the North-west monsoon, owing to heavy rains, and in the South-east monsoon, owing to haze, landmarks on the Celebes coast may only be visible from a comparatively short distance, and it is, therefore, sometimes difficult to make the land before reaching the entrance to this channel. The following hills near the Celebes coast may be useful for fixing a vessel's position:—

Batu Tollong, situated about one mile inland close southward of Pare Pare baai and about 16 miles northward of Panikiang, slopes gradually on its north-western side, but is steep on its eastern and south-eastern sides; Batu Kiki, about 1½ miles north-north-eastward of Batu Tollong, is not noticeable. Lappo Kri Kri, about 10 miles south-south-eastward of Batu Tollong, has a very prominent, conical peak; this mountain, bearing 090°, leads well northward of all dangers of Spermonde archipel. Batu Karbouw, 6½ miles south-south-westward of Lappo Kri Kri, has four small peaks close together, and is steep on its western side; on some bearings only two peaks are visible, and from north-westward care should be taken not to confuse this mountain with the rugged summit of a range farther inland.

Landmarks.—Without local knowledge, and with the sun in an unfavourable position for seeing discolorations, beacons, and other marks, the navigation of the Northern channel, both inwards and outwards, demands the utmost attention. The various islets on either side of the route, and those some distance westward, much resemble each other, whilst fairly distant marks must often be used for fixing the vessel's position at and during the various alterations of course. The description of the various islets useful as landmarks, as well as the beacons, is given in the directions. Although this channel runs comparatively close to the Celebes coast only the following summits are useful as aids to navigation:—

Bergje van Barroe (Barru), about one mile within the Celebes coast and 7 miles south-westward of Batu Karbouw, is more noticeable when seen from southward than westward. Allah Porang, about 9 miles south-south-eastward of Bergje van Barroe, rises steeply to a blunt summit. Piek van Tanette, about 1½ miles southward of Allah Porang, has a very sharp summit. Tjapia (Chapia), nearly 2 miles south-

Charts 941b, 1263, 2759a.

Charts 3044, 2637.

south-westward of Piek van Tanette, has two summits lying about east and west of each other, but can only be identified from westward and south-westward; Piek van Tanette is the highest of these last three mountains. Lanti Angoro, about 1½ miles southward of Tjapia, has three summits lying approximately east and west of each other, but only the two western are shown on the chart; the eastern of these two is sharp when seen from northward and blunt from westward, whilst the western is rounded. *See* views facing pages 422, 430.

Directions.—Dangers.—Beacons.—The northern entrance to the Northern channel lies between a number of reefs extending about 1½ miles westward from the low, wooded island Panikiang (*Lat. 4° 22′ S., Long. 119° 36′ E.*) and Tomisa, a reef about 3 miles westward of Panikiang. Tomisa has a depth of 5 feet ($1^{m}5$) over it, and is marked by a white beacon surmounted by a ball. A vessel approaching should steer 179° for a position 7 cables eastward of this beacon, whence she should steer about 197° for 8 miles, to a position about 6 cables eastward of Bromo reef, which mostly dries; the wreck of the steamship *Bromo* lies on the northern side of this reef, and is visible about 11 miles in clear weather. Several reefs lie eastward of this track between Tomisa and Bromo; one of them, lying about 2 miles south-westward of the southern end of Panikiang, has a beacon, surmounted by a black truncated cone above a white ball, on its northern edge.

From the position about 6 cables eastward of Bromo reef, and with Poeti (Puti) Angin, a noticeable islet covered with high trees, about 1½ miles off the Celebes coast, bearing 104°, the vessel should steer about 212°, and pass about 1¾ miles eastward of a white stone beacon with a black band on the southern reef of Bugi Manila or Batu Lola, which lies about 3 miles south-westward of Bromo; she should continue on this course until she is about 2 miles east-south-eastward of the north-eastern reef of Batu Pankaja, which lies 6¼ miles south-westward of the beacon on Bugi Manila and has a depth of 5 feet ($1^{m}5$) over it; the south-western reef of Batu Pankaja, about one mile farther south-westward, has a depth of 3 feet ($0^{m}9$) over it. From this position, Piek van Tanette should bear 088°, and Sakoala, a very prominent islet covered with coconut trees, lying about 2 miles off the Celebes coast and 9 miles south-south-eastward of the beacon on Bugi Manila, should bear 130°. Laja, a low islet covered with high trees, lying about 11 miles south-south-westward of Sakoala, should just appear in sight, and its western side should be brought in line with a beacon, surmounted by two white balls, on Batu Loear (Luar), a reef about 6½ miles northward of Laja, bearing 185°. The vessel should keep on this alignment, which will lead about half a mile westward of Gosong Toea Radja (Tua Raja) and other reefs lying within a distance of 4 miles westward of Sakoala; there are some small sandbanks, which dry, on these reefs.

When steering on the above alignment the vessel's position should be carefully fixed, especially as the beacon on Batu Loear is not always seen in good time, either owing to the position of the sun, or hazy or rainy weather; the islands north-westward of Hoek van Labakkang, situated on the Celebes coast about 13 miles south-westward of Piek van Tanette, afford good marks for this purpose. Salemo, Sagara, and Sabanko, in this group, are covered with coconut trees. When the northern extremity of Salemo bears 107°, a black stone beacon

Charts 941b, 1263, 2759a.

Charts 3044, 2637.

with a white band on the western Taka Talloe (Tallu) reef, situated 7½ miles southward of Sagara, should be brought in line with a similar beacon on a reef south-westward of Satando, bearing 174°; Satando lies about 3½ miles southward of Sagara (*Lat. 4° 42′ S., Long. 119° 27′ E.*), and, like Banko Bankoang on the opposite side of the channel, is thickly wooded with high trees; Taka Talloe consists of three reefs, which dry.

The vessel should keep the above alignment on until about half a mile eastward of the southern extremity of Saboeton (Sabuton), a thickly wooded islet with one large crown-topped tree on it, about 2½ miles southward of Batu Loear; Sapoeli (Sapuli), covered with coconut trees, lies on the eastern side of the channel, and nearly 2 miles southward of Sagara. Thence she should steer 180° through the Narrows of Banko Bankoang, where the current sometimes attains a rate of 1½ knots; a white beacon surmounted by a ball stands on the fringing reef extending from the northern side of Banko Bankoang, situated about one mile southward of Saboeton, and marks the western side of the Narrows. When the eastern side of Sapoeli is in line with the beacon south-westward of Satando, bearing 013°, and the south-western side of Saboeton is in line with the north-eastern extremity of Banko Bankoang, bearing 341°, she should alter course to 162°, on which course the south-western side of Saboeton will be just shut in by the north-eastern extremity of Banko Bankoang.

When the beacon on Taka Talloe bears 181°, the vessel should steer for it on this bearing, passing about 3 cables eastward of Batu Tello, which comprise three coral reefs, which dry, lying nearly 2½ miles southward of Banko Bankoang; when covered they are often marked by a brown discoloration. The beacon on Taka Talloe stands about a quarter of a cable within the western edge of the westernmost reef, and the vessel should pass about 2 cables westward of it and then bring it in line astern with Sapoeli, bearing 001°; Satando will be seen astern just westward of this alignment, and eastward of it are the wooded islets Saoegi (Saugi) and Tjamba Tjambang (Chamba Chambang), the latter having a large round-topped tree on it. On this course the black stone beacon with a white band on Batu Loea (Lua), about 9 miles southward of the beacon on Taka Talloe, will be sighted; Batu Loea is always covered, but there are two rocks above water on its south-western side, and the beacon stands near them.

Charts 3044, 1293.

When on the track between Taka Talloe and Batu Loea beacons particular care should be taken to identify the following landmarks, as they are useful for the subsequent alterations in course near Batu Loea:—On the western side; Karanrang Keke, a wooded islet about 1½ miles south-westward of Laja; Balang Tjadi (Chadi), a wooded islet about 3 miles north-westward of Batu Loea beacon; and Maoeang (Mauang), an islet covered with high shrubs, lying about 2 miles north-north-westward of Batu Loea beacon. On the eastern side: Boeloe Boeloe (Bulu Bulu), a wooded hill on the Celebes coast about 3½ miles east-north-eastward of Taka Talloe beacon; Piekje van Boengoro (Bungoro peak), an isolated, pointed summit about 2½ miles north-eastward of Boeloe Boeloe and almost in the middle of Boengoro gebergte (*see* view facing page 430); and a noticeable clump of coconut trees on Tanjong Kasi (Ujong Kassi), about 8½ miles southward of

Charts 3044, 1293.

Boeloe Boeloe. With the north-going current, during the South-east monsoon, there are generally tide-rips for some distance north-eastward of Batu Loea, giving the impression that this reef is larger than is actually the case.

When about 4½ cables northward of the beacon on Batu Loea (*Lat. 4° 59′ S., Long. 119° 27′ E.*) the vessel should alter course to 232°, passing between this beacon and Boenga Eidja (Bunga Eija), a reef with a depth of 3 feet (0^m9) over it, and only marked by discoloration under favourable conditions, lying 8 cables north-north-westward; there is no leading mark for this course, and the current generally sets across it. As Batu Loea can be safely passed on either side the vessel will often find it more convenient, with good visibility, and especially when there is a south-going current, to pass eastward of this reef, bearing in mind that a 5½-fathom (10^m1) patch lies about three-quarters of a mile north-eastward of it. After passing eastward of Batu Loea the beacon on this reef may be brought in line with a dip in Boengoro gebergte, bearing 032°, astern, or in line with Piekje van Boengoro, bearing 026°; the latter leads very close north-westward of a 4¼-fathom (7^m8) patch lying off the north-western edge of Batu Mandang, a large reef about one mile southward of Batu Loea. Boeloe Boeloe in line with Batu Loea beacon (*see* view facing page 444), bearing 019°, leads close along the eastern side of the above 4¼-fathom (7^m8) patch; this alignment shows that a vessel is too close inshore. Course should be subsequently altered to 173° when on the alignment given below.

A vessel passing between Batu Loea and Boenga Eidja should continue to steer 232° until Karanrang Keke is in line with the western side of Balang Tjadi, bearing 351°, and the clump of coconut trees on Tanjong Kasi is in line with the beacon on Batu Loea, bearing 068°, when course should be altered to 173°; Karanrang Keke will soon disappear from sight, but the eastern side of Balang Tjadi can be kept astern, bearing 353°, well open westward of Maoeang. The current here often sets obliquely across the track; the white stone beacon with a black band on Barang Baringang, a steep-to reef, which dries, lying about 4 miles southward of Batu Loea, should be kept just on the starboard bow.

Chart 1293.

The beacon on Barang Baringang should be passed at a distance of 3½ cables, and when bearing about 270°, course should be altered to 210°; after passing Barang Baringang the depths decrease gradually to 3¼ fathoms (5^m9) over a bank of mud and sand extending from the Celebes coast. When Bone Malalaja, a reef, which dries, with a white sandbank on its eastern side, lying about 1½ miles south-westward of Barang Baringang, is abeam course should be altered to about 201°, passing eastward of Gosong Trabanoesoe and Gosong Panjoa (*see* page 426) into the roadstead; the depths increase again to 6 fathoms (11^m0) and over near Bone Malalaja.

Vessels proceeding seaward from Makasser by the Northern channel can follow the directions just given in the reverse order. When approaching the Narrows of Banko Bankoang, Laja should be identified in good time for the reasons given on page 434 for the Northern approach.

WESTERN SIDE OF CELEBES.—Coast.—The portion of the

Charts 2637, 941b, 1263, 2759a.

Chart 1293.

west coast of Celebes abreast the Northern channel, is of no importance for general shipping, and only a brief description will be given; the principal landmarks, which are useful for the navigation of the Northern channel, are described on page 434.

Sungei Tello flows out about 2½ miles east-north-eastward of the northern end of the quays at Makasser, and has a depth of about 11 feet (3ᵐ4) in its mouth; in the approach, however, are sandbanks and hard ground, through which two shoal passages give access to the mouth. Tanjong Kasi Roekang (Rukang) (*Lat. 5° 05′ S., Long. 119° 27′ E.*), on the northern side of the entrance, appears as a gently sloping hill, otherwise the land here is low and marshy.

Bergje van Pateene (Patine), about 3½ miles north-eastward of Tanjong Kasi Roekang, has a sharp, conical summit, on which there is a prominent tree. Sungei Koemba (Kaimba) flows out westward of this mountain, and the coast here is rocky. About 1½ miles northward of the mouth of this river are two rocky islands Koeri Tjadi (Kuri Chadie) and Koeri (Kuri) Lompo, separated from the coast by creeks; there is a village, with two prominent trees northward of it, on the western side of Koeri Tjadi, and there is also a prominent tree on the northern extremity of Koeri Lompo. Rivier van Maros discharges through a delta, which is only navigable for praus, close northward of Koeri Lompo; Bawana Lamboesoe (Lambusu) is the arm most frequently used. The district surrounding this river is densely populated, Maros, about 5½ miles inland, being the principal village, and which is connected to the telephone system.

Reede Maros is bounded by the arc of a circle, described with a radius of about 13¾ cables, from a position in approximately lat. 5° 00′ S., long. 119° 30′ E.

Charts 1293, 3044.

Tanjong Kasi (Ujong Kassi) lies about 1½ miles northward of the northern mouth of Rivier van Maros, and Kandjatongang, a shallow rivulet, discharges close southward of the point. Bonto Nompo village and a clump of coconut trees stand on the southern side of the entrance.

Chart 3044.

From Tanjong Kasi to the mouth of the Bawana Marana, an unimportant river flowing out about one mile north-eastward, the coast is thickly wooded.

Piek van Maros (chart 2637), about 15 miles eastward of Tanjong Kasi, has a double peak, but from most directions seaward appears as a single, sharp summit. In clear weather this peak can be seen from the outer edge of Spermonde archipel; *see* view facing page 444.

Binanga Sangkarang, the largest and deepest river on this part of the coast, flows out nearly 5 miles northward of Tanjong Kasi, and up to 4 miles from its entrance has a depth of from 16 to 23 feet (4ᵐ9 to 7ᵐ0); there are, however, extensive sandbanks off the mouth, through which there is a channel with a depth of only 4 feet (1ᵐ2).

Pangka Djene rivier rises near the northern slopes of Piek van Maros, and splits into two arms, the Tanga and Towa, near the village Pangka Djene (Jene); the Tanga divides again into two arms near the coast, and the northern of these, situated about 2 miles northward of Binanga Sangkarang, is the most serviceable, although a hard, steep-to sandbank, which nearly dries, lies off the entrance.

Charts 2637, 941b, 1263, 2759a.

Chart 3044.

Reede Pangka Djene, off the mouths of Pangka Djene rivier, is bounded on the north by the parallel of the beacon situated on Taka Talloe (page 436), on the south, by a line drawn in a 112½° direction from that beacon to the coast, and, on the west, by the meridian of a position on the parallel of Taka Talloe beacon, situated 2 miles from the coast.

Boeloe Boeloe and Boengoro gebergte are described on page 436. Tanjong Kata Djowa (Jowa), about 2¾ miles northward of Boeloe Boeloe, is not prominent, but Patjina Badji (Pachina Baji) village, close northward of the point, may be identified by the coconut trees around it. Tanjong Toea (Tua) (*Lat. 4° 45′ S., Long. 119° 29′ E.*), 1½ miles northward of Tanjong Kata Djowa and the south-western extremity of Hoek van Labakkang, is low and inconspicuous. Tanjong Kasi Kebo, about 4 miles north-eastward of Tanjong Toea, is rocky.

Rivier van Segeri flows out about 4¼ miles north-eastward of Tanjong Kasi Kebo, and is about half a cable wide at its mouth, but there is a depth of only 2 feet ($0^{m}6$) in the entrance channel; Segeri village is situated about 1¾ miles up this river. From the mouth of Rivier van Segeri to Tanjong Panring, about 18 miles northward, the coast is low and intersected by numerous rivulets, of no importance to navigation.

Reede Barroe, about 13 miles northward of the mouth of Rivier van Segeri, is bounded by a line, drawn in a 188° direction from the south-western extremity of Panikiang (page 433), between the parallels of the northern entrance points of Barroe and Ladjari (Lajari) rivieren.

The whole of the Celebes coast just described, from Makasser to Tanjong Panring, is fronted by a bank of varying width, which gradually becomes narrower northward of Rivier van Segeri; several reefs, sandbanks, and islets lie on or near this bank, and those of any importance have been described on pages 434-437.

Charts 3128, plan of Pare Pare bay, 3044.

Between Tanjong Panring and Tanjong Tonrangang, about 17½ miles northward, the coast becomes hilly and is indented by numerous small bays; although the coastal bank is narrow along this part, several reefs and islets lie off it, the positions of which may best be seen on the chart. Batu Tollong and the other summits along this part of the coast have been described on page 434. Tanjong Djonga (Jonga), about 12 miles northward of Tanjong Panring, has a prominent hill on it, named Karang Boeloe (Bulu).

Chart 3128, plan of Pare Pare bay.

Pare Pare baai.—Light.—Dangers.—Beacons.—Pare Pare baai, entered between Tanjong Tonrangang and Tanjong Lero, 1¼ miles west-north-westward, is divided into two portions by a narrow passage, the inner part being known as Soepa (Supa) baai. In the outer bay the depths vary from 9 to 30 fathoms ($16^{m}5$ to $54^{m}9$), and in the eastern part of Soepa baai from 5 to 8 fathoms ($9^{m}1$ to $14^{m}6$); a shoal, with a depth of 3¾ fathoms ($6^{m}9$) over it, lies in the middle of the narrows leading to Soepa baai, but there are greater depths on either side of it. The tidal streams may attain a rate of 2 knots.

A light is exhibited, at an elevation of 37 feet ($11^{m}3$), from a white iron structure, 26 feet ($7^{m}9$) in height, on the eastern edge of the reef extending from Tanjong Lero.

Taka Tallange, with a least depth of 5 feet ($1^{m}5$) over it, lies about

Chart 3128, plan of Pare Pare bay.

3½ cables south-westward of Tanjong Tonrangan, and close outside the coastal bank. A reef extends about 4 cables southward from the southern side of Tanjong Lero; it was reported, in 1927, to have extended about 2½ cables farther southward than shown on the chart. Badjangan (Batu Bajangan) and Roenga (Runga) Paroi lie on the western side of the bay, within 6 cables northward of Tanjong Lero, and have depths of 8 and 3 feet ($2^{m}4$ and $0^{m}9$) over them, respectively. Laoebang (Batu Laubang), with a depth of one foot ($0^{m}3$) over it, lies on the eastern side of the bay, about 2 miles northward of Tanjong Tonrangang. Tete, which dries 4 feet ($1^{m}2$), lies near the edge of the bank extending from the western side of the narrows. In 1946, it was reported to have extended about 2 cables southward.

A black beacon (*Lat. 4° 01′ S., Long. 119° 37′ E.*), surmounted by a cone, marks the south-eastern extremity of Tete, and a white beacon, surmounted by a ball, marks the western extremity of Laoebang.

Reede Pare Pare is the area between the parallels of the beacon on Laoebang, and the summit of Dapo, an islet situated on the western side of Soepa baai, about one mile north-westward of the western entrance point of that bay.

Pare Pare, a well-populated village extending along the eastern side of the narrows, is the headquarters of a Government official. A Government pier, with a depth of 16 feet ($4^{m}9$) alongside its head, in 1946, extends from the southern part of the village; there are two mooring buoys off this pier. There is another pier, with a depth of 23 feet ($7^{m}0$) alongside, about half a cable southward of the Government pier. There is a hospital, with a ward for infectious cases.

Directions.—A vessel approaching Pare Pare baai from southward should keep Tanjong Lero in line with the hill on the western side of the narrows, bearing 019°, and thence pass not less than one cable eastward of the light-structure southward of that point; the coastal reef on that side is plainly marked by discoloration. When inside the entrance she should steer for the northern extremity of the land at the northern end of Pare Pare village, bearing 031°, which leads between the beacons marking Laoebang and Tete.

From northward a vessel will remain in deep water by keeping Batu Karbouw (chart 3044) in line with Baki, a low island 4 cables westward of Tanjong Djonga, bearing 160°; the western side of the coastal reef extending from Tanjong Lero is not marked by discoloration.

Chart 2637.

Coast.—Northward of Pare Pare baai the coast becomes low and wooded. The following hills and mountains, although some distance inland, are noticeable: Manarang and Paleteang, two conical hills, 433 and 512 feet ($132^{m}0$ and $156^{m}1$) high, about 11 and 17 miles northward of Tanjong Lero, respectively, rising from low, undulating land; Tirasa, 3,150 feet ($960^{m}1$) high, about 8½ miles northward of Paleteang, is a spur from the high mountain land, which approaches nearer the coast here; Boentoe (Buntu) Letta, 5,249 feet ($1{,}599^{m}9$) high, about 9½ miles northward of Tirasa, is the highest peak of a ridge, but is not easily identified; Boentoe Poeang (Buntu Puang), about 8½ miles westward of Boentoe Letta, is a prominent conical summit; Boentoe Poesoe (Buntu Pusu), 2 miles northward of Boentoe Poeang, is a saddle mountain more noticeable from southward than westward; Saloe-

Charts 941b, 1263, 2759a.

Chart 2637.

watan (Saluwatan), about 5½ miles north-westward of Boentoe Poesoe, is steep and somewhat detached from the surrounding mountains; Tenggelang, about 14 miles west-north-westward of Saloewatan, is a noticeable summit of a ridge extending from the latter.

Tanjong Lanrisan, 9 miles northward of Tanjong Lero, has a thick clump of coconut trees on it, and there is a very noticeable mosque on the beach close northward of the point. Sungei Sawito (Saga Saga) flows out southward of Tanjong Lanrisan (*Lat. 3° 55′ S., Long. 119° 32′ E.*), and has a depth of barely 2 feet (0^{m}6) in the channel over the bar; a large rock, with a depth of 3 feet (0^{m}9) over it, lies about three-quarters of a mile westward of the mouth. Temporary anchorage can be obtained by vessels with local knowledge inside the 5-fathom (9^{m}1) line southward of the mouth.

A prominent tree stands about 5 miles northward of Tanjong Lanrisan.

Tanjong Saloepolo (Salupolo) and Tanjong Paria, about 12½ and 14½ miles north-north-westward of Tanjong Lanrisan, are points of the delta of Sungei Sadang and are covered with tall trees; the delta was reported, in 1947, to be extending. Good anchorage can be obtained by vessels with local knowledge off the northern arm of this delta.

BOCHT VAN MANDAR.—Dangers.—Bocht van Mandar is entered between Tanjong Paria and Hoek Mandar, 32 miles westward; in the eastern part between Tanjong Paria and Battowaë, a prominent island close offshore, about 13 miles north-north-westward, there are several dangers within the 100-fathom (182^{m}9) line.

Tanjong Kajoeangingge (Kajuangingge), about 5 miles north-north-eastward of Tanjong Paria, may be identified by a prominent wood of high casuarina trees and one noticeable tree. The point was reported, in 1947, to be extending. A reef, which dries, and a shoal, with a depth of one foot (0^{m}3) over it, both marked by discoloration, lie about 4½ and 3½ miles, respectively, south-westward of Tanjong Kajoeangingge and nearly 3 miles offshore. Pasie Tangan, a reef, with a depth of one foot over it, lies about 2½ miles westward of the same point, and is seldom marked by discoloration. It is marked by a black beacon, surmounted by a cone.

Sungei Boengi (Bunji) flows out about 2 miles north-north-eastward of Tanjong Kajoeangingge and about 6 miles northward of this point is the mouth of Sungei Binanga Karaëng. Several reefs, including Karang Mentjerai (Menchenai), about 2¾ miles south-westward of the mouth of the Binanga Karaëng, lie within the line joining Tanjong Kajoeangingge and the summit of Battowaë; unless thoroughly acquainted with the locality this part of the bay should be avoided.

Chart 3209, plan of Polewali road.

Reede Polewali. — Dangers. — Beacons. — The spacious bay between Battowaë and Tanjong Lako Lako, an inconspicuous point about 5 miles westward, is well sheltered by a reef, which dries, extending about 2½ miles westward from the south-western end of Battowaë and other reefs farther westward; there are several detached reefs in the eastern part of the bay. Tanjong Mampija (Mampya) is the extremity of a tongue of land extending in a north-easterly direction from Tanjong Lako Lako.

A white beacon, surmounted by a ball, stands on the western

Charts 941b, 1263, 2759a.

Chart 3209, plan of Polewali road.

extremity of the reef, which dries, extending westward from Battowaë, and a black beacon, surmounted by a cone, stands on the eastern end of an extensive reef about half a mile westward; the usual entrance to the roadstead lies between these two beacons.

A reef, with a depth of one foot (0^{m}3) over it, lies about 2¼ miles eastward of Tanjong Mampija and 5½ cables from the northern shore; it is marked by a black beacon, surmounted by a cone. A detached reef lies about 8 cables farther eastward and is marked by a white beacon, surmounted by a ball.

The roadstead is bounded by the arc of a circle, drawn with a radius of 11 cables, from the flagstaff.

There are several villages along the shore. Taka Tidoeng (Tidung) and Polewali (*Lat. 3° 27′ S., Long. 119° 21′ E.*) being the principal; the latter is the residence of a Government official, and there are the remains of a boat pier, which show above water at low water springs, just southward of the flagstaff. A conspicuous white mosque stands near the shore at Polewali, and there is another mosque on the western side of Alli Alli, a village close westward of Taka Tidoeng. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Directions.—Approaching Reede Polewali, Battowaë will be easily identified by a group of trees standing on its otherwise bare summit. From westward a vessel should bring the summit of Boentoe Poeang (chart 2637) in line with the summit of Battowaë, bearing 073°, and should keep this alignment on until Saloewatan (chart 2637) bears 021°; the latter bearing leads between the two beacons marking the entrance.

Chart 2637.

Coast.—Light.—Tanjong Boekoe (Buku), with the fairly large village of Boekoe (Buku) on it, lies about 6 miles south-westward of Tanjong Mampija; Tanjong Laboeang (Labuang) is a steep, rocky point about 5½ miles westward of Tanjong Boekoe, and between these two points Sungei Tjampalagiang (Champalagiang) flows out through a delta. A light is occasionally exhibited, at an elevation of 23 feet (7^{m}0), from a wooden post near the western entrance point of the western mouth. Temporary anchorage can be obtained by vessels with local knowledge, in a depth of about 8 fathoms (14^{m}6), about 2¾ cables offshore south-eastward of this light, but eastward of the delta, off Panjampa village, there is usually a heavy swell in both monsoons. The large village of Tjampalagian stands about 1½ miles up the river, and there is a considerable traffic with praus; local knowledge is essential for entering the river, and the current is very strong. A mosque with a white minaret, 131 feet (39^{m}9) in height, situated about one mile westward of the entrance to the eastern arm of the delta of the river, is a prominent landmark.

Chart 2662, plan of Reeden Madjene and Balangnipa.

Reede Balangnipa.—Light.—Sungei Balangnipa flows out at the head of a bight between Tanjong Laboeang and Tanjong Baoeroe, about 7½ miles south-westward. There is anchorage for small vessels on the edge of the bank extending from the coast eastward of the river, in a depth of 4 fathoms (7^{m}3), mud and sand, with the mouth of the river bearing 335°, distant about 9 cables; this position is close southward of a coral pinnacle, with a depth of 6 feet (1^{m}8) over it,

Charts 941b, 1263, 2759a.

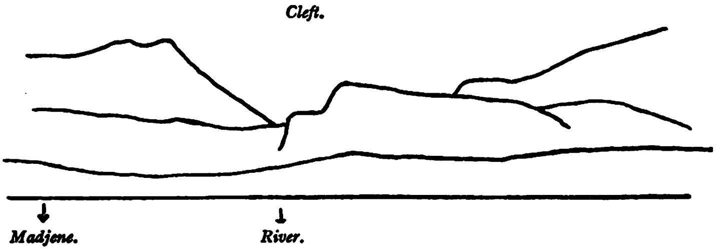
Chart 2662, plan of Reeden Madjene and Balangnipa.

and 2 cables northward of this pinnacle is a rock which dries. The holding ground is bad, and in the east monsoon the anchorage is often rendered useless. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and there is a considerable native trade.

A light is occasionally exhibited, at an elevation of 69 feet ($21^{m}0$), from a wooden post on the eastern entrance point of Sungei Balangnipa. A white beacon, surmounted by a ball, stands on the western edge of the bank on the eastern side of the approach to the river.

Tanjong Baoeroe (*Lat. 3° 34′ S., Long. 119° 00′ E.*) is a low, rounded point, covered with high trees, which gives it the appearance of a low, dark island when seen against the higher land in the vicinity.

Reede Madjene.—Lights.—Reede Madjene, at the head of a bay between Tanjong Baoeroe and Hoek Mandar, about 3½ miles westward, is bounded by the parallel of a position 1300 metres (about 7 cables), southward of the flagstaff, and by the meridian of a position 800 metres (about 4½ cables), westward of the flagstaff. It is well-sheltered and anchorage may be obtained during the west monsoon, in a depth of about 25 fathoms ($45^{m}7$), sand, in a break in the coastal reef off the stone pier at the village of Madjene, but there is only room for one vessel here; in the east monsoon a swell frequently sets in during the afternoon. Nearly 2 miles northward of Madjene there is a cleft in the mountains, which is a useful mark when making for the roadstead from southward. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and there is considerable native trade. There is a harbour doctor.



Approach to Reede Madjene from southward.

(*Original dated* 1947.)

A light is exhibited, at an elevation of 17 feet ($5^{m}2$), from an iron column on the head of a stone pier at Madjene; vessels approaching the roadstead at night should keep this light in sight.

In case landing is impracticable, vessels can proceed to Reede Pambaoewang (*see* page 444).

Hoek Mandar is comparatively low, but rises gradually within to high mountainous land; there are villages on the southern and eastern sides. A reef, which dries, named Taka Sitodong, extends about 3½ cables from the cape, and this is prolonged south-westward by a submerged portion, the 100-fathom ($182^{m}9$) line lying about 6 cables offshore here. *See* view facing page 444.

A light is exhibited, at an elevation of 305 feet ($93^{m}0$), from a white iron framework structure, 69 feet ($21^{m}0$) in height, situated on the western side of Hoek Mandar.

Charts 941b, 1263, 2759a.

Charts 2636, 2637.

COAST.—From Hoek Mandar to Paloe baai, about 180 miles north-north-eastward, the western coast of Celebes generally rises abruptly from the sea to high mountainous land; the 100-fathom (182^{m}9) line runs close to the coast and there are no dangers outside this depth line. There are few noticeable features among the mountains, but vessels can determine their position by the high points of land.

Chart 2662, plan of Reede Pambaoewang.

Reede Pambaoewang.—Reede Pambaoewang is a small bay entered about 5 miles north-north-westward of Hoek Mandar, and affords sheltered anchorage in the east monsoon when Reede Madjene is unserviceable. The best anchorage is in the southern part of the bay, off the southern part of Pambaoewang village, in depths of from 15 to 17 fathoms (27^{m}4 to 31^{m}1), soft mud, where there is less swell than in the northern part. The entrance points of the bay are high and rocky, and a reef, which dries, extends about 2 cables from the southern side.

The roadstead is visited by vessels of the Koninklijke Paketvaart Maatschappij when practicable; there is a considerable native trade.

Chart 2662, plan of Baaien Tjinrana and Binaga.

Baaien Tjinrana and Binaga. — Dangers. — Binanga village (*Lat. 3° 21′ S., Long. 118° 51′ E.*) stands at the head of Baai van Binaga, entered about 9 miles northward of Pambaoewang. Anchorage may be obtained off the village during the east monsoon, in a depth of 15 fathoms (27^{m}4). A reef, which dries, and on which there is a rock above water, extends about 2½ cables from the coast northward of the bay, and a vessel approaching from northward, should not steer for the anchorage until the village bears about 090°.

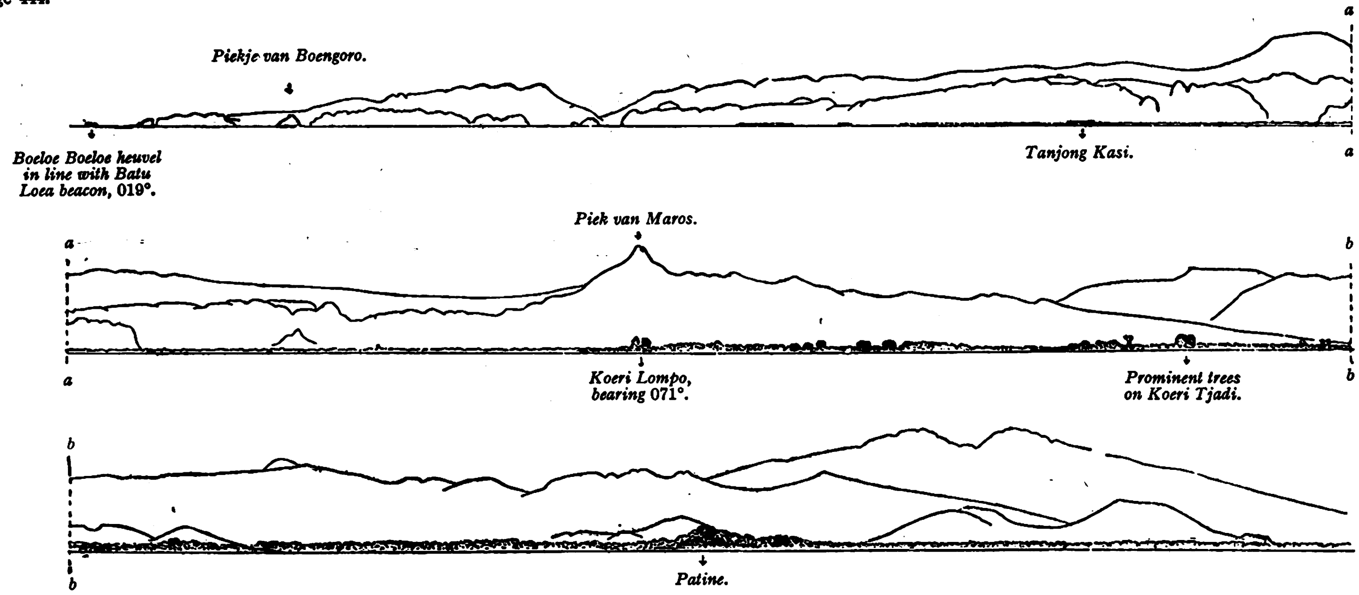
Tjinrana village is situated on the southern side of Baai van Tjinrana, about 1¾ miles northward of Binanga; Taimanoe, lying on the coastal reef northward of the village, is a very prominent, thickly wooded islet, about 100 feet (30^{m}5) high. A small vessel can obtain sheltered anchorage, even in the west monsoon, in depths of from 16 to 18 fathoms (29^{m}3 to 32^{m}9), with the northern extremity of Taimanoe bearing not more than 270°. Two reefs, each with a least depth of 5 fathoms (9^{m}1) over it, lie about 9 cables offshore and about 4½ cables north-north-eastward and northward, respectively, of Taimanoe.

Chart 2637.

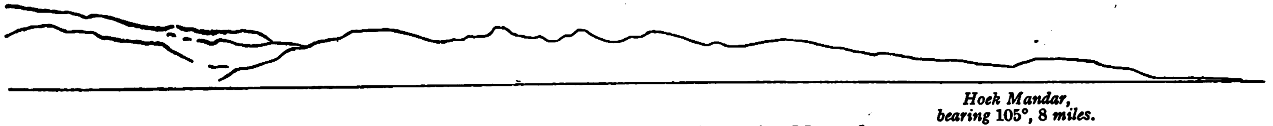
Libani baai.—Anchorages.—Libani baai is entered between Tanjong Ongkona (Onkona), the low north-western extremity of a high peninsula, 14½ miles northward of Taimanoe, and Tanjong Kai, 13 miles farther northward. Tanjong Lombone lies about 1½ miles north-eastward of Tanjong Ongkona, and, from westward, is more noticeable than the latter. Lombone village stands at the head of a small bay between these two points, and there is good anchorage for vessels with local knowledge off the village, in depths of from 16 to 19 fathoms (29^{m}3 to 34^{m}7), sand, about 2¼ cables offshore.

Libani baai affords little opportunity for anchoring, except in the northern part, as elsewhere the 100-fathom (182^{m}9) line runs close along the high, steep shores; in about the middle of the eastern shore there is a low plain, through which Sungei Maloenda flows. Maloenda (Malunda) village stands at the mouth of this river, and about three-

Charts 941b, 1263, 2759a.

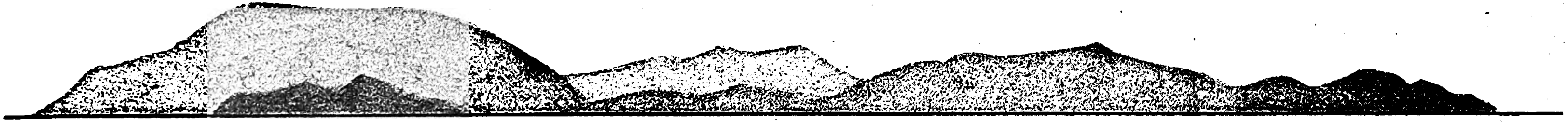

Piekje van Boengoro.
a
Boeloe Boeloe heuvel in line with Batu Loea beacon, 019°.
Tanjong Kasi.
a
Piek van Maros.
a
b
a
Koeri Lompo, bearing 071°.
Prominent trees on Koeri Tjadi.
b
b
Patine.
b

View, in three parts, of Northern channel to Makasser
(*Original dated* 1931.)



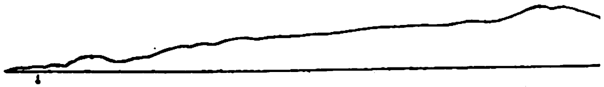
Celebes, west coast. Hoek Mandar.
(*Original dated* 1931.)

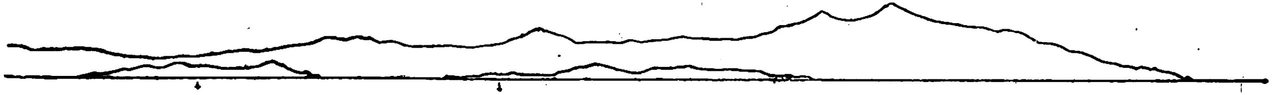
To face page 445.



Celebes, west coast; Zuidwachter.

(*Original dated* 1903.)





Two views of north-west coast of Celebes. North-east point of Sematan bearing 152°, distant 18 miles.

(*Originals dated* 1931.)

Chart 2637.

quarters of a mile north-eastward of it is Tanisi village, at the mouth of a small creek; anchorage can be obtained by vessels with local knowledge, in depths of from 11 to 16 fathoms (20^m1 to 29^m3), off a noticeable rock, covered with vegetation, near the latter village.

Chart 2662, Reeden Tappalang and Kai.

The villages of Tappalang and Kai stand on the northern shore of Libani baai, and anchorage can be obtained off the former, in depths of from 15 to 20 fathoms (27^m4 to 36^m6), sand, and off the latter in a depth of about 20 fathoms (36^m6); these anchorages are, however, exposed to southerly winds, and in the east monsoon there is often a swell, especially in the afternoons. Tanjong Tappalang, between these two villages, may be identified by a group of trees, standing in the water.

Tanjong Kai (*Lat. 2° 52′ S., Long. 118° 46′ E.*) is low and covered with mangroves; a reef, which dries, extends about one mile southward from this point, and is usually marked by surf or discoloration. Northward of Tanjong Kai the coast becomes high again.

Chart 3209, plan of Mamuju bay.

Baai van Mamoedjoe. — Lights. — Beacons. — Dangers. — Baai van Mamoedjoe (Mamuju) is entered immediately eastward of Kaap William, situated about 15 miles northward of Tanjong Kai. Kaap William or Tanjong Rangas is low and covered with mangroves, but rises to high land within; the coastal reef here extends about 2 cables offshore, and there are irregular depths outside. A 3½-fathom (6^m4) patch lies about 4 cables north-north-eastward of the cape.

A light is exhibited, at an elevation of 266 feet (81^m1), from a white iron framework structure, 69 feet (21^m0) in height, about 9 cables within Kaap William.

Baai van Mamoedjoe is divided into two parts by Pulau Mamoedjoe (Mamuju), a fairly high, thickly wooded island, somewhat difficult to distinguish from the land behind when seen from north-westward or northward of Kaap William. The shore of the bay westward of Tanjong Kasimba (Kasiba), the point southward of Pulau Mamoedjoe, is low and planted with coconut trees; eastward of that point it is covered with mangroves. The land behind is hilly.

Bone Tengah, an extensive reef, which dries, with a small tree about 2 cables from its south-western end, lies in the passage between Tanjong Kariing, the southern extremity of Pulau Mamoedjoe, and Tanjong Kasimba. Three reefs lie between the south-western end of Bone Tengah and the shore; the north-eastern of these has a depth of 3 feet (0^m9) over it. A 5½-fathom (10^m1) patch lies nearly half a mile north-eastward of the north-eastern reef.

A white beacon, surmounted by a ball, stands on the north-eastern edge of Bone Tengah, and a white beacon, surmounted by a ball, marks the 3-foot (0^m9) patch southward of the south-western end of this reef.

Reede Mamoedjoe is the area lying southward of the parallel of Tanjong Kariing.

There is a stone landing pier, with steps and a shed with a zinc roof at the head, off the house of the Government official, and there is also a landing place for boats near the Custom house on the western entrance point of Sungei Mamoedjoe, which river discharges close south-westward of Tanjong Kasimba.

Charts 941b, 1263, 2759a.

Chart 3209, plan of Mamuju bay.

A light is exhibited, at an elevation of 23 feet ($7^{m}0$), on the inner end of the stone pier.

There are several villages along the southern shore of the bay; Mamoedjoe (Mamuju), which contains the houses of the Rajah and the Government official, is the largest. There is a harbour doctor.

Vessels of the Koninklijke Paketvaart Maatschappij call here regularly, and usually anchor with the pier bearing 142°; there is also suitable anchorage northward of Tanjong Kasimba. The passage between Pulau Mamoedjoe and the shore southward is not recommended for large vessels, as a strong current runs through it.

Directions.—Vessels from north-westward can proceed without difficulty to the anchorage off the stone pier at Mamoedjoe, bearing in mind that a 4¾-fathom ($8^{m}7$) patch lies about 3 cables westward of the head of this pier; there are considerable depths in the approach, and these decrease rapidly towards the head of the bay. Large vessels making for this anchorage from north-eastward should pass some distance northward of Pulau Mamoedjoe, on account of the reef which extends about half a mile northward from it, and then proceed along the western side of this island.

Large vessels making for the anchorage between Tanjong Kasimba (*Lat. 2° 40′ S., Long. 118° 54′ E.*) and Bone Tengah from westward, should pass northward of Pulau Mamoedjoe and then steer with a prominent mountain crest bearing 192°, which leads about one cable eastward of Bone Tengah; when a flat-topped hill south-westward of Mamoedjoe village comes in line with the beacon on the 3-foot ($0^{m}9$) patch southward of Bone Tengah, bearing 237°, course may be shaped for the anchorage.

Small vessels with local knowledge can make use of the passage between Bone Tengah and Tanjong Kasimba, passing about half a cable southward of the beacon marking the 3-foot ($0^{m}9$) patch, but this channel is very narrow, and, as previously stated, a strong current runs through it.

Chart 2637.

Coast.—Dangers.—Beacon.—Between Mamoedjoe and Tanjong Lalereh, about 45 miles north-north-eastward, the high land approaches close to the coast, but the points are low, with trees standing in the water. Baai van Bèlang Bèlang (Beling Beling), about 18 miles north-eastward of Mamoedjoe, is of no importance to shipping, as it is much encumbered by reefs and is backed by inaccessible country; the high, thickly wooded island Lioetang, 246 feet ($75^{m}0$) high, lying at the head of the bay, is prominent.

Sampaga village, with a noticeable mosque, stands about 10 miles northward of Lioetang and close southward of the mouth of Sungei Karama. A reef extends about one mile from the coast immediately southward of the village; a reef extends about one cable southward from the western entrance point of the river, and its extremity is marked by a black beacon, surmounted by a cone. Anchorage can be obtained by vessels with local knowledge off the mouth of the river, and the place is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij; praus and lighters can always pass in and out of the river, as there is no surf.

Boeding Boeding (Buding Buding) village is situated nearly 15 miles northward of Sampaga. About half a mile southward of the village

Chart 2637.

there are some dead trees on a projecting part of the coastal reef, and temporary anchorage, in a depth of 14 fathoms ($25^{m}6$), can be obtained by vessels with local knowledge north-westward of these trees; the bottom is too steep to anchor off the village itself.

Between Tanjong Lalereh and Tanjong Pasang Kajoe, about 50 miles northward, the appearance of the coast is very similar to that southward, but there are more prominent summits near the coast, and some of the points are more noticeable. Tobintah, an island, 485 feet ($147^{m}8$) high, with its western side very steep, lying close offshore, about 7½ miles north-eastward of Tanjong Lalereh, is very prominent; anchorage can be obtained by vessels with local knowledge, in a depth of 14 fathoms ($25^{m}6$), about 3½ cables westward of Tobintah and northward of a wooded hill on the coast close eastward of Gamboenah village, situated on the coast south-westward of that island. Several detached reefs, all steep-to and seldom marked by discoloration, lie within the 100-fathom ($182^{m}9$) line between Tobintah and Tanjong Tjenoki (Chenoki) (*Lat. 1° 41′ S., Long. 119° 17′ E.*), 15 miles northward. There is anchorage for vessels with local knowledge, well sheltered in both monsoons, in a depth of 16 fathoms ($29^{m}3$), mud, about 1½ cables off Korossa (Karossa), a large village situated on the western shore of a small bay about midway between Tobintah and Tanjong Tjenoki; this place is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Tanjong Tjenoki rises steeply to a wooded hill; the coastal reef extends about one mile westward from this point. Doda village stands at the head of a small bay about 3 miles north-north-eastward of Tanjong Tjenoki, and sheltered anchorage can be obtained off it by vessels with local knowledge; the coastal reef extends as much as one mile northward from the points south-westward of the village.

Sungei Lariang flows out about 14 miles northward of Doda village, and can be readily identified by a hill behind the right bank; elsewhere the coast in this vicinity is low, sandy and wooded. The coastal bank southward of the mouth of the river is steep-to and vessels should keep outside the 10-fathom ($18^{m}3$) line here; a reef, which nearly dries, lies on this bank about 2 miles south-westward of the mouth of the river; shoals, which have not been examined, were reported, in 1935, to lie north-eastward of this reef. There is anchorage for vessels with local knowledge on the edge of the bank extending from the coast northward of the river, with the northern entrance point of the river mouth bearing 090°, distant about 6 cables. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Charts 2636, 2637.

A conspicuous peak, covered with vegetation, lies about 6½ miles east-north-eastward of the mouth of Sungei Lariang. Tanjong Pasang Kajoe (Kayu), about 15 miles northward of the mouth of Sungei Lariang, is low, and can be easily identified by a very large tree standing by the sea; the coastal reef dries out about 4 cables north-westward from the point.

Chart 3209, plan of Pasang Kayu bay.

Pasang Kajoe baai.—Pasang Kajoe (Kayu) baai is entered between Tanjong Pasang Kajoe and Tanjong Bakoe (Baku), 3 miles north-eastward; Sungei Pasang Kajoe (Kayu), with the village of

Charts 941b, 1263, 2759a.

Chart 3209, plan of Pasang Kayu bay.

Kaloekoe (Kaluku) at the mouth, flows out at the head of the bay, which is fringed by a wide bank of sand and stones which dries. A reef of sand and stones, which dries, lies nearly one mile north-westward of Kaloekoe village, and other reefs lie eastward and north-eastward of this reef. Kaloekoe village is not visible from seaward.

The best anchorage is off Tjenapoe (Chenapu) village, situated on the southern shore of the bay, in a depth of 10 fathoms ($18^{m}3$), about 2½ cables from the beach; although open to northerly and north-westerly winds, the reef gives some protection from northerly swell.

Chart 2636.

Coast.—Between Tanjong Bakoe (*Lat. 1° 08′ S., Long. 119° 23′ E.*) and Tanjong Karang, 37 miles north-eastward, the high land approaches close to the coast, but the points are low, with trees standing in the water; a strip of hilly land which gradually becomes narrower and higher towards its northern end, lies between the high mountains and the coast. There are numerous villages along the coast between Tanjong Bakoe and Soeramana (Saramana) village, about 21 miles north-eastward.

Rocks, which dry, lie about one mile southward of Tanjong Ira, situated 16 miles north-north-eastward of Tanjong Bakoe.

Tanjong Towali, about 10 miles north-eastward of Soeramana village, can only be identified when close to the coast; there is a noticeable structure fitted with a white board on the seaward side of the point. Towali, 1½ miles west-north-westward of this point, consists of two bare sandbanks barely marked by discoloration, lying close together on a reef, which dries, and about 1½ miles north-eastward of this reef is a detached reef, with a depth of 2½ fathoms ($4^{m}6$) over it. Vessels should not pass between these dangers and the coast. There is good holding ground of sand and stones for vessels with local knowledge on the ridge between Towali sandbanks and Tanjong Towali. A 2¾-fathom ($5^{m}0$) patch lies near the coast about 2¼ miles north-eastward of Tanjong Towali, and a shoal, with a least depth of 3¾ fathoms ($6^{m}9$) over it, lies about one mile off-shore 2¼ miles south-westward of the light-structure on Tanjong Karang. Two conical peaks are noticeable, Loli (*see* below), and one 3,573 feet ($1{,}089^{m}1$) high, 3¾ miles south-eastward of Tanjong Towali.

Chart 3209, plan of Palu bay.

Paloe baai.—Paloe (Palu) baai, entered between Tanjong Karang and Tanjong Towaja, 4 miles north-eastward, only affords anchorage in the small indentations in the shore on either side, and off the village of Paloe (Palu) at the head; elsewhere the depths are too great. A bank, with a depth of 19 fathoms ($34^{m}7$) over it, was reported, in 1948, to lie in the entrance to Paloe baai, about 2¼ miles eastward of Tanjong Karang. The western side of the bay rises steeply to hills and mountains, which increase in height towards the south; Loli, about 5 miles westward of Paloe village, and conical in shape, is 6,713 feet ($2{,}046^{m}2$) high, and is the most prominent of these. On the eastern side there is a hilly strip about 3 miles wide, which merges into steep mountains inland. At the head of the bay a gradually rising plain, with rice fields, stretches far inland. *See* view on chart 2636.

Tanjong Karang is the north-eastern extremity of a broad, high tongue of land, on the north-western extremity of which is a noticeable hill, 338 feet ($103^{m}0$) high.

Charts 941b, 1263, 2759a.

Chart 3209, plan of Palu bay.

A light is exhibited, at an elevation of 266 feet (81^{m}1), from a white iron framework structure, 69 feet (21^{m}0) in height, situated on the slopes of this hill.

Chart 3209, plan of Dongala road.

Reede Donggala. — Lights. — Beacon. — Dangers. — Reede Donggala is bounded by the arc of a circle drawn with a radius of half a mile from a beacon, situated at the Custom house, in Donggala (Dongala) village, about 1¼ miles southward of Tanjong Karang.

A light is occasionally exhibited, at an elevation of 39 feet (11^{m}9), from a beacon, surmounted by a white triangle, point up, on the head of the pier.

The coastal reef extends about 1¾ cables northward from the beacon in the village, and is marked at its northern extremity by a light-beacon; the coastal reef also extends about 1½ cables from a position about 4 cables south-eastward of the beacon in the village, and is marked at its outer edge by a light-beacon, surmounted by a black triangle, at an elevation of 10 feet (3^{m}0).

A beacon (*Lat. 0° 40′ S., Long. 119° 44′ E.*), surmounted by a white triangle, stands on a hill 2¼ cables west-south-westward of the beacon in the village.

Tidal streams.—The tidal streams in Reede Donggala are sometimes strong. It may occur that during a strong south-east-going stream outside the 100-fathom (182^{m}9) line there may be a strong north-north-west-going stream in the roadstead.

Anchorage.—Directions.—The best anchorage is midway between the two light-beacons marking the outer edges of the coastal reef, about 2 cables offshore, in a depth of 16 fathoms (29^{m}3), mud, with the beacon on the hill in line with the beacon in the village, bearing 232°. If this position is occupied, a vessel can anchor, in a depth of not less than 24 fathoms (43^{m}9), with the beacon in the village bearing between 204° and 261°. Small vessels can anchor off the beacon in the village, in a depth of 10 fathoms (18^{m}3). When making for the anchorage the coastal reef extending from Tanjong Karang is easily avoided, as it is usually marked by discoloration and surf; the western shore should then be given a good berth until on the anchorage mark.

Donggala.—There is a landing pier for boats near the Customs house which is the largest building in the village. Donggala is an export place for forest produce etc. and is the headquarters of a Government official. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3209, plan of Palu bay.

Western side of Paloe baai.—Telok Kaboengah (Kabunga) is entered about 2 miles south-south-eastward of Donggala, and is almost entirely encumbered by reefs, leaving only two deep basins, which are accessible for small vessels with local knowledge through narrow channels; two low islets, covered with vegetation, lie on a tongue of the coastal reef extending into the middle of the bay. Kaboengah (Kabunga) Besar village stands on the southern shore of the bay, at the head of the southern basin; a small vessel can anchor off this village, in a depth of 8 fathoms (14^{m}6), mud and sand, about one cable offshore. The entrance to the channel, which is generally marked by bamboo stakes, is found by approaching with Kaboengah Besar village, only two houses of which are visible, in line with the southern entrance point of the bay.

Charts 2660b, 941b, 1263, 2759a.

Chart 3209, plan of Palu bay.

Tanjong Kasiboeri (Kasiburi), about 4 miles southward of Telok Kaboengah, has a noticeable rock off it; Kasiboeri (Kasiburi) village stands on the shore of a small bight southward of the point, and anchorage can be obtained here by vessels with local knowledge, in depths of from 16 to 18 fathoms (29m3 to 32m9), sand and stones. There is no other sheltered anchorage along this shore of the bay.

Chart 3209, plan of Wani road.

Eastern side of Paloe baai.—Anchorages.—Beacons.—Reede Wani lies off the village of the same name on the eastern side of Paloe baai, 6½ miles south-south-eastward of Tanjong Towaja (*Lat. 0° 37′ S., Long. 119° 47′ E.*).

A cross beacon stands about half a cable south-south-eastward of the mosque and a beacon surmounted by a white triangle, point down, stands about 2½ cables south-eastward of the mosque.

Anchorage is recommended, in a depth of about 27 fathoms (49m4), with the latter beacon bearing 085°, and the former beacon in line with the mosque, bearing 334°.

Wani is occasionally visited by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3209, plan of Palu bay.

The eastern shore of Paloe baai between Wani and Paloe affords only two berths for vessels with local knowledge, and praus will usually be seen lying at anchor there. Off Panteloean (Panteluan), about 1½ miles south-eastward of Wani, there is anchorage, in a depth of 19 fathoms (34m7), with the eastern end of the village bearing 000°; Panteloean is the export place for Towaëli, a village of some importance standing about 1½ miles southward and a short distance inland. The other anchorage is off Mamboro village, about 5½ miles farther southward, in a depth of 15 fathoms (27m4), mud and sand, with the middle of the village bearing about 020°, and 2 cables offshore.

Chart 3209, plan of Palu road.

Reede Paloe.—Reede Paloe, at the head of Paloe baai, is bounded by the parallel of lat. 0° 52′ S., eastward of the meridian of long. 119° 51′ E.

Paloe is a fairly large village; Sungei Paloe is only navigable for praus. The usual anchorage is off the landing pier about one mile north-eastward of the mouth of the river, which is connected to Paloe by road; vessels only lie quietly here at night, as during the day the sea breeze causes a heavy swell. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. There is a harbour doctor at Paloe.

Chart 2636.

Coast.—Dangers.—The coast between Tanjong Towaja and Tanjong Manimbaja, about 38 miles north-north-westward, is steep and sparsely wooded; the high mountains in the interior are visible a great distance in clear weather, but have no prominent summits.

Alindau village, 15½ miles northward of Tanjong Towaja, is situated on a very noticeable plateau, from 30 to 70 feet (9m1 to 21m3) high, at the head of a small bight; with offshore winds anchorage can be obtained here by vessels with local knowledge, in depths of from 30 to 40 fathoms (54m9 to 73m2). Tanjong Boh lies about 5½ miles northward of Alindau, and between this point and Tompe village, 3 miles farther northward, the coast is somewhat flat and sandy. Rocks were

Charts 2660b, 941b, 1263, 2759a.

Chart 2636.

reported, in 1948, to lie about 1¼ miles south-westward of Tanjong Boh and about 6 cables offshore. Anchorage can be obtained by vessels with local knowledge off Tondo village, close north-eastward of Tanjong Boh, in depths of from 19 to 25 fathoms ($34^{m}7$ to $45^{m}7$). Linde village, about 2 miles northward of Tompe, may be identified by a coconut wood.

Labuan Labeia, entered about 2¼ miles north-north-westward of Linde, affords good anchorage for vessels with local knowledge, in depths of from 30 to 41 fathoms ($54^{m}9$ to $75^{m}0$), sand; the narrow isthmus forming the northern side of the bay is scarcely one mile across. Tanjong Labeia (*Lat. 0° 09′ S., Long. 119° 48′ E.*), the eastern entrance point of the bay, is very prominent, and rises to an elevation of 1,152 feet ($351^{m}1$) a short distance within; a reef extends nearly 2 cables from this point, and half a mile south-westward is a detached reef, with a depth of 3¾ fathoms ($6^{m}9$) over it. A coral reef, with a depth of 6 fathoms ($11^{m}0$) over it, lies outside the 100-fathom ($182^{m}9$) line and about 3½ miles south-westward of Tanjong Labeia. Batu Mekadja (Mekaja), a coral reef, which dries, near the western entrance point of the bay, is generally marked by discoloration when covered.

Tanjong Manimbaja is the north-western extremity of a high, rocky peninsula; Tanjong Biroe (Biru), about 3½ miles east-north-eastward of Tanjong Manimbaja, rises steeply to a hill with a large tree on it. Between these two points is Balesang baai, with Sewia village situated in the south-eastern corner, whence a footpath leads to Balesang lake, at an elevation of about 330 feet ($100^{m}6$), where the native chief of the district resides. There is anchorage off Sewia for vessels with local knowledge, in depths of from 27 to 30 fathoms ($49^{m}4$ to $54^{m}9$), with Tanjong Manimbaja in line with two rocky points on the southern shore of the bay, bearing 279°, and the prominent tree on Tanjong Biroe bearing 000°; this anchorage should be approached with Sewia village bearing between 122° and 162°.

Off-lying island and danger.—Pasie Perombian, about 2¾ miles west-north-westward of Tanjong Manimbaja, is a steep-to coral reef, which dries; when covered it is usually marked by discoloration. Tanjong Dampelas in line with the south-eastern side of Zuidwachter, bearing 049°, leads about one mile north-westward of Pasie Perombian.

Zuidwachter (South Watcher) or Pososo, about 5½ miles northward of Tanjong Manimbaja, is a densely wooded island, 354 feet ($107^{m}9$) high, and is uninhabited. The fringing reef extends about three-quarters of a mile from the southern side of the island, and a basin in the reef here affords anchorage to vessels with local knowledge, in depths of from 25 to 30 fathoms ($45^{m}7$ to $54^{m}9$). *See* view facing page 445.

Bocht van Tamboe.—Islets and dangers.—Bocht van Tamboe (Tambu), entered between Tanjong Biroe and Tanjong Dampelas, a low point, 13½ miles north-north-eastward, has low sandy shores backed by high mountains. In the southern half of the bay is a group of rocky, wooded islets, from 150 to 200 feet ($45^{m}7$ to $61^{m}0$) high, on which the inhabitants of the villages Awisang and Pamaloeloe (Pamalulu), on the western shore of the bay, have their plantations; a detached reef, with a depth of 1¼ fathoms ($2^{m}3$) over it, lies about one mile north-westward of Laoet (Laut), the outer islet, and a reef extends about the same distance northward from this islet. A reef, which dries, lies close south-eastward of Laoet, and the remaining islets lie close

Charts 2660b, 941b, 1263, 2759a.

Chart 2636.

together on a reef which partly dries about one mile farther south-eastward; a detached reef, with a depth of 2¾ fathoms ($5^{m}0$) over it, lies about one mile westward of the latter group. Several isolated coral reefs lie within 1¼ miles of the eastern shore of the bay between the villages Seweili and Sibajoe (Sibaju), situated about 15 and 8¾ miles, respectively, south-eastward of Tanjong Dampelas.

Anchorage can be obtained by vessels with local knowledge off Pamaloeloe village (*Lat. 0° 04′ S., Long. 119° 45′ E.*), in a depth of 30 fathoms ($54^{m}9$), sheltered from westerly and south-westerly winds. There is fairly sheltered anchorage for vessels with local knowledge, in depths of from 19 to 25 fathoms ($34^{m}7$ to $45^{m}7$), in the small bay off Sibajoe village, but care should be taken to avoid a 2-fathom ($3^{m}7$) patch lying about 1½ miles south-south-westward of the village.

Balesang and Pamaloeloe, 2,215 and 1,831 feet ($675^{m}1$ and $558^{m}1$) high, respectively, on the peninsula forming the south-western side of Bocht van Tamboe, and Batoe Kenjai (Batu Kenyai), a mountain with a flat summit, 2,185 feet ($666^{m}0$) high, about 5 miles southward of Seweili village, are prominent.

Discoloured water was reported, in 1949, about one mile north-westward of Tanjong Dampelas.

Coast.—At Tanjong Parepa, nearly 3 miles north-eastward of Tanjong Dampelas, the coast is steep for a distance of 3 miles to Sabang, a village which stands on the southern shore of the bay entered between Tanjong Parepa and Tanjong Begimpoeang (Begimpuang), about 6 miles northward. Reede Dampelas or Reede Sabang affords anchorage to vessels with local knowledge, in depths of from 16 to 25 fathoms ($29^{m}3$ to $45^{m}7$), off Sabang village and nearly 2 cables offshore, with Noordwachter bearing 349°, just open westward of Tanjong Begimpoeang; Sabang village consists of only about three houses standing in a coconut plantation, but is easily identified. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Tanjong Ajoeang (Ayuang) and Tanjong Rerang, on the north-eastern shore of the bay between Tanjong Parepa and Tanjong Begimpoeang, are low and covered with mangroves; several reefs lie in the bight between these two points.

Tanjong Begimpoeang consists of coral rocks nearly 200 feet ($61^{m}0$) high. Tanjong Siraroe (Siraru) lies about 6 miles northward of Tanjong Begimpoeang, and close northward of this point a ridge of dead coral runs parallel with the coast, thus forming a natural breakwater; a great portion of the land behind covers at high water.

Off-lying islands and reefs.—Light.—Anchorages.—Pangalasiang lies close to the coast 3¼ miles north-north-eastward of Tanjong Siraroe; although this island is 532 feet ($162^{m}1$) high, it is difficult to distinguish from the mainland. A number of reefs lie within a distance of 2 miles offshore and 2 miles eastward of Pangalasiang.

Mapoeti (Maputi), about 2 miles north-westward of Pangalasiang, is a wooded island, 561 feet ($171^{m}0$) high. The channel between this island and Pangalasiang is clear of dangers, but Pasie Bangilongan, a coral reef, which dries, sometimes marked by small fishing stakes, lies about 2¼ miles eastward of Mapoeti; this reef is not marked by discoloration when covered, and, as the current here is strong, the channel should be used with caution.

Charts 2660b, 941b, 1263, 2759a.

Chart 2636.

With northerly winds there is sheltered anchorage for vessels with local knowledge, in a depth of 19 fathoms ($34^{m}7$), sand, nearly 1¾ cables offshore, between two rocky points on the coast southward of Pangalasiang (*Lat. 0° 29′ N., Long. 119° 54′ E.*); the southern of these points lies about one mile southward of Pangalasiang, and Salo Papoi, a small rivulet, flows out close northward of the point. With westerly and south-westerly winds there is sheltered anchorage for vessels with local knowledge, in depths of from 19 to 25 fathoms ($34^{m}7$ to $45^{m}7$), sand, between the reef which dries extending eastward from Pangalasiang and a reef which has a depth of 5 feet ($1^{m}5$) over it, lying near the coast about half a mile eastward of the island. The narrow channel between Pangalasiang and the mainland should not be attempted, and to reach the anchorage eastward of Pangalasiang from westward a mid-channel course should be steered between this island and Mapoeti; when the north-eastern side of Noordwachter bears 303°, just open north-eastward of the north-eastern side of Mapoeti, a vessel should keep this mark on astern, until the rocky eastern entrance point of a creek, which dries, on the mainland south-eastward of Pangalasiang, bears 207°, when she should steer for it on this bearing, and anchor as soon as the channel between Pangalasiang and the mainland is open. The reef, with a depth of 5 feet ($1^{m}5$) over it, lying close eastward of this anchorage, is not always marked by discoloration, and caution should be exercised.

Noordwachter (North Watcher) or Toegoean, about 4¼ miles north-westward of Mapoeti, is a thickly wooded island, 364 feet ($110^{m}9$) high. A ridge, with a least depth of 8 fathoms ($14^{m}6$) over it, extends about one mile southward from the island, and anchorage can be obtained here by vessels with local knowledge, in depths of from 8 to 11 fathoms ($14^{m}6$ to $20^{m}1$).

A light is exhibited, at an elevation of 299 feet ($91^{m}1$), from a white iron framework structure, 66 feet ($20^{m}1$) in height, on the summit of Noordwachter.

The channel between Noordwachter and Mapoeti is clear of dangers, but there is often a strong current setting northward or southward, the latter predominating.

Coast.—Between Pangalasiang and Tanjong Bau, about 12 miles north-north-eastward, the coast forms a bight and is low, monotonously wooded, and sparsely inhabited; the southern shore of the bight is covered with mangroves, and there is a sandy beach along the eastern shore. Except for the reefs lying eastward of Pangalasiang the bight is clear of dangers, and anchorage can be obtained anywhere by vessels with local knowledge, provided the shore is not approached within a depth of less than 19 fathoms ($34^{m}7$). Dangoelan (Dangulan) village is situated on the southern shore, 4 miles eastward of Pangalasiang, and about 3 miles east-north-eastward of it there is a small settlement at the mouth of Salo Taipan, a small rivulet with a depth of 2 feet ($0^{m}6$) at the entrance.

Pasie Bau, about one mile north-westward of Tanjong Bau, is a reef, which dries, marked by discoloration when covered; the south-eastern extremity of Taring, an islet, bearing about 050°, open north-westward of Tanjong Bogoang, leads north-westward of this reef. Tanjong Bogoang, about 3½ miles north-north-eastward of Tanjong Bau, is a steep, rocky point with a noticeable tree on it, which can be

Charts 2660b, 941b, 1263, 2759a.

Chart 2636.

seen from the vicinity of Mapoeti. Taring is a steep, wooded islet, 177 feet (53^{m}9) high, lying about half a mile offshore and about 1½ miles north-eastward of Tanjong Bogoang, and can be passed safely at a distance of about 2½ cables on its western side ; in the passage between Taring and the coast there is a depth of only 2¾ fathoms (5^{m}0), and a strong current runs through. Seijanki (Seiyanki) eilanden lie on a coral reef, which dries, extending 5 cables from the coast about 1¼ miles north-eastward of Taring, and are lower and smaller than that islet. Anchorage can be obtained by vessels with local knowledge in the small bay between Seijanki eilanden and Tanjong Ijoh (Iyoh) (*Lat. 0° 45′ N., Long. 120° 06′ E.*), 1¼ miles eastward, in depths of from 19 to 25 fathoms (34^{m}7 to 45^{m}7), off the small village of Tando Ijoh ; Tanjong Ijoh is a rocky point, 80 feet (24^{m}4) high, with some detached rocks above water off it, and a bank, with a depth of 1¾ fathoms (3^{m}2) over it, extending about half a mile northward.

Aspect.—Eastward and south-eastward of Tanjong Bau is some of the highest land in Celebes ; Ogoamas gebergte has few noticeable features, but the highest peak, about 12 miles south-eastward of the point, rises to an elevation of 9,843 feet (3,000^{m}1) ; Sodjolo (Sojolo), about 9 miles eastward of Tanjong Bau, is a remarkable conical peak, 8,967 feet (2,733^{m}1) high and, in clear weather, can be seen throughout the northern part of Macassar strait. Soni, 5 miles north-north-eastward of Sodjolo, is 1,732 feet (528^{m}0) high, and prominent. Siloemba (Silumba), 2,835 feet (864^{m}1) high, is connected to the northern end of Sodjolo by a mountain crest with four fairly prominent peaks. Binanga 2,037 feet (620^{m}9) high, with a wide cupola-shaped summit, lies about one mile northward of Siloemba. About 8½ miles northward of Binanga is a prominent peak, 1,526 feet (465^{m}1) high.

Bocht van Dampal.—Dangers.—Bocht van Dampal, entered between Tanjong Ijoh and Tanjong Simaula, about 11 miles north-eastward, is so encumbered by steep-to reefs, of which sounding gives no warning, that it should not be entered unless these dangers are clearly visible ; the two outer reefs are Pasie Dongalan, which is always uncovered and easily distinguished, about 4 miles north-eastward of Tanjong Ijoh, and Pasie Seranga, about 8 miles north-north-eastward of Tanjong Ijoh, with a depth of 1¼ fathoms (2^{m}3) over it.

Tanjong Simaula is a steep, rocky point, visible a considerable distance from northward. Pasie Siokan, a reef awash, lies about 2¼ miles north-westward of the point. There is a large village on the coast about 6 miles eastward of Tanjong Ijoh.

Coast. — Dangers. — Buoy. — Tanjong Penjoe (Penyu), about 2½ miles northward of Tanjong Simaula, is very striking, as it rises to a hill covered with reeds, showing up light green against the dark trees around. Tanjong Jaga (Yaga), about 2¼ miles northward of Tanjong Penjoe, is a sandy point with a few isolated trees of very striking shape on the extremity.

Lingian, about one mile north-westward of Tanjong Jaga, is a low, wooded coral island, visible about 14 miles, and is fringed by a reef, which dries, extending about 2 miles from its western side ; the rocky islet Koko, which may be identified by its white sandy beach, lies on the edge of the reef extending from the south-eastern extremity of Lingian.

Charts 941b, 942a, 1263.

Chart 2636.

The channel between Lingian and the mainland is navigable, provided the reefs are plainly visible and attention is paid to the strong current usually setting through, but it should only be used by vessels with local knowledge ; as the current sets almost constantly southward it is inadvisable to attempt the passage from northward.

Chart 3394.

Hoek Dondo or Tanjong Agisolo, about 3 miles north-eastward of Tanjong Jaga, is about 60 feet (18^{m}3) high, and appears from eastward as a low, sandy point, with hills rising a short distance within. Tanjong Bobantji (Bobanchi), about 4 miles eastward of Hoek Dondo, has a noticeable hillock on it. Taidoen (Taidun), about 4 cables east-south-eastward of Tanjong Bobantji, is a rock covered with vegetation, lying on the south-eastern part of a rock which dries.

Pasie Bambaipoela (Bambaipula), with a depth of 5 feet (1^{m}5) over it, lies nearly 2½ miles north-eastward of Hoek Dondo, and about 4 cables north-westward of Bambaipoela is a reef with a depth of 3¾ fathoms (6^{m}9) over it ; both these reefs are marked by discoloration. A small reef, with a depth of 2½ fathoms (4^{m}6) over it, lies about one mile westward of Tanjong Bobantji (*Lat. 0° 59′ N., Long. 120° 22′ E.*) and nearly half a mile offshore, and is usually marked by tide-rips.

Sematan, about 2 miles north-eastward of Tanjong Bobantji, is a thickly wooded, hilly island, fringed by a narrow coral reef, which partly dries, and is steep-to on its eastern side ; on the western side are four detached reefs, but the island can be safely passed at a distance of 8 cables here. Tampalekang, about 3½ cables southward of Sematan, is a low islet covered with coconut trees, and is inhabited. A white conical buoy is situated at the extremity of the reef which extends from the western side of the islet. *See* view facing page 445.

Directions.—There is a clear channel both southward and northward of Tampalekang. From westward, making for the southern channel, it is advisable to pass northward of the 3¾-fathom (6^{m}9) reef lying north-westward of Pasie Bambaipoela, steering a more southerly course when Taidoen is well open north-eastward of Tanjong Bobantji ; thence a mid-channel course should be held between this point and Tampalekang. Tide-rips up to a distance of nearly 3 cables north-eastward of Tanjong Bobantji often give the impression that the coastal reef extends farther than is actually the case.

For the passage northward of Tampalekang, from westward, after passing northward of Pasie Bambaipoela and the adjacent reef, a vessel should steer for the southern extremity of Sematan, bearing 089°, until the south-western extremity of Tampalekang bears 180°, when a slightly more southerly course may be steered through the channel. If the southern sharp cone, 2,923 feet (890^{m}9) high (page 456), of the mountains behind Toli Toli, on the eastern side of Baai van Dondo, is visible, it may be kept in line with the southern extremity of Sematan, bearing about 091°, for entering this strait.

BAAI VAN DONDO.—Dangers.—Baai van Dondo, entered between Tanjong Bobantji and Tanjong Pangaloeang (Pangaluang), about 17½ miles eastward, affords anchorage off the southern and eastern shores, but elsewhere there are depths of over 100 fathoms (182^{m}9) a short distance offshore. The high mountains north-eastward of Tanjong Pangaloeang and eastward of Toli Toli are often obscured

Charts 941b, 942a, 1263.

Chart 3394.

by clouds, but the sharp cone, 2,923 feet ($890^{m}9$) high, on their southern slope is sometimes visible from a great distance; northward of the highest peak, which is 7,560 feet ($2{,}304^{m}3$) high, this range becomes gradually lower.

Western side of Baai van Dondo.—Telok Santigi, the small bay immediately southward of Tanjong Bobantji, affords sheltered anchorage under all conditions, in depths of from 16 to 20 fathoms ($29^{m}3$ to $36^{m}6$), at a distance of about 2½ cables from the village at the head; the approach lies southward of Taidoen, but the bay should only be entered at low water, when the coastal reef is plainly visible.

Telok Bananga lies in the south-western corner of Baai van Dondo, and is bounded on the east by a narrow, hilly tongue of land terminating northward in Tanjong Senjangang (*Lat. 0° 52′ N., Long. 120° 23′ E.*); the western and southern shores of this bay are low and sandy, the eastern shore is rocky. Stadong, on the western shore, is a village standing in the midst of extensive coconut plantations, and is visited occasionally by vessels of the Koninklijke Paketvaart Maatschappij; there is a small pier. A reef, which dries, was reported, in 1948, to lie off Stadong. There is anchorage off Stadong, in a depth of 38 fathoms ($69^{m}5$), about 2½ cables offshore, with a zinc roof in the village bearing 298°, and a point southward of Tanjong Batoe (Batu) Banga, 4½ miles southward of Tanjong Bobantji, bearing 012°, but care should be taken to avoid this reef. Temporary anchorage can be obtained farther southward, off the mudbank extending from the mouth of Salo Bananga, about 4¼ miles southward of Tanjong Batoe Banga, in depths of from 25 to 30 fathoms ($45^{m}7$ to $54^{m}9$), about 2 cables offshore. Loeak (Luak) village is situated on the southern shore of Telok Bananga, and a reef, which dries, lies about 3 cables northward of it; there is temporary anchorage here, in a depth of 33 fathoms ($60^{m}4$), with Tanjong Senjangang bearing 030°, and the northern entrance point of Limbana Loeak (Luak), about 1¾ miles southward of Tanjong Senjangang, bearing 105°, but it must be borne in mind that this position is only about one cable northward of the reef which dries. Limbana Loeak affords sheltered anchorage, in a depth of about 18 fathoms ($32^{m}9$); the entrance is narrow but clear of dangers, and the low western point can be rounded by eye.

Southern and eastern sides of Baai van Dondo.—Reefs.—A wide flat extends from the southern and eastern shores of Baai van Dondo, and anchorage can be obtained in several places along the southern shore. Tiboe (Tibu), a rocky islet, about 60 feet ($18^{m}3$) high, lies on the coastal reef about 3 miles southward of Tanjong Senjangang. Lais village, where the native chief of Dondo frequently resides, is situated about 3¼ miles east-south-eastward of Tiboe; there is anchorage northward of this village, in a depth of 30 fathoms ($54^{m}9$), 2¾ cables offshore, with Tanjong Senjangang bearing 321°, and Tanjong Ogogili, about 4 miles eastward of Lais, 091°.

Several reefs, which dry, lie within one mile of the shore in the bight between Lais and Tanjong Ogogili. A reef, with a depth of 2½ fathoms ($4^{m}6$) over it, known locally as Pasie Lamenti, lies about 1½ miles north-westward of Tanjong Ogogili; Pasie Beloewah (Beluwah), a reef, which dries, marked by discoloration when covered, lies nearly 2 miles northward of the same point.

Tinabogan village is situated about 2 miles eastward of Tanjong

Charts 2636, 941b, 942a, 1263.

Chart 3394.

Ogogili, and there is anchorage off it, in a depth of 26 fathoms ($47^{m}5$), with Tanjong Ogogili bearing 265°, and the village, 173°.

Telok Pagaloengian (Pagalungian) lies in the south-eastern corner of Baai van Dondo, and the densely wooded hills on its eastern side rise steeply from the water; the western side is low and covered with mangroves. Malalang, a small village, is situated on the western entrance point, which can be passed close to, but the coastal reef extends about 8 cables from the opposite point; the shores of the bay are fringed by a reef, which dries, on which lie several islets. There is anchorage, in a depth of 25 fathoms ($45^{m}7$), about 1½ cables offshore, between the south-western extremity of the reef extending from the eastern entrance point and Malalang; the inner part of the bay is only navigable when the reefs are plainly visible.

The eastern shore of Baai van Dondo, between Telok Pagaloengian and Tanjong Pangaloeang (Pangaluang), is sparsely populated and there are no good anchorages. Loeang (Luang) (*Lat. 0° 49′ S., Long. 120° 36′ E.*), a rock about 30 feet ($9^{m}1$) high, lies on the coastal reef about 2¾ miles northward of Telok Pagaloengian. Pasie Saloengkan (Salungkan), a reef, which dries, lies about three-quarters of a mile offshore and about one mile north-north-westward of Loeang. Tanjong Maradja (Maraja), 4 miles northward of Loeang, is a low point covered with shrubs and mangroves; Salo Maradja (Maraja) flows out on the southern side of this point, and, although it is navigable for a considerable distance by small craft, the channel over the bar is so narrow that there is barely room for a boat to turn. Tanjong Pangaloeang is a steep spur of a mountain ridge.

COAST.—Samoejan (Samuyan) is a high, densely wooded islet lying on the coastal reef about 4 miles north-eastward of Tanjong Pangaloeang. Latoengan, a wooded island, 522 feet ($159^{m}1$) high, nearly 6 miles north-eastward of Samoejan, bearing 060° and open north-westward of the latter, leads clear of the coastal reef and the detached reef between the latter islet and Tanjong Pangaloeang. Balowoh, a small village about 1½ miles east-north-eastward of Tanjong Pangaloeang, is reached by native craft through a gully in the coastal reef.

Tingi Langa lies close offshore about 6 cables east-north-eastward of Samoejan, and has a very prominent hill, 709 feet ($261^{m}1$) high, in its north-eastern part. The western extremity of this island is connected to the mainland by the fringing reef, but southward and south-eastward of the island is a narrow passage, named Telok Boelias (Bulias), which affords shelter in all winds. Several reefs lie off the entrance, which lies on the eastern side of Tingi Langa, and the reefs should be plainly visible before attempting to enter; the depths decrease from between 20 and 25 fathoms ($36^{m}6$ to $45^{m}7$) at the entrance to 15 fathoms ($27^{m}4$) in the basin southward of the island. Boelias (Bulias) village is an unimportant settlement on the eastern side of the entrance.

The coast between Telok Boelias and Tanjong Toli Toli, about 3½ miles north-eastward, is fringed by a fairly wide coastal reef, with some detached reefs outside.

Off-lying islands and dangers.—Tidal streams.—Kapetan lies with Tanjong Paligisan, its south-eastern extremity, about 1¾ miles north-north-westward of Samoejan, and is separated from it by a deep

Charts 2636, 941b, 942a, 1263.

Chart 3394.

channel clear of dangers. A ridge of hills runs almost the entire length of the island, but a small flat part near the middle gives it the appearance of two islands when seen from the channel southward of Sematan (page 455); the most prominent summit, 571 feet ($174^{m}0$) high, is in the south-eastern part. A rock above water, with depths of 10 fathoms ($18^{m}3$) around, lies about one cable outside the coastal reef extending from the north-western end of Kapetan. From the north-eastern extremity of the island the coastal reef extends one mile, and on it is Bool, an islet, lying about 3 cables from the point; a detached reef, with a depth of 1¼ fathoms ($2^{m}3$) over it, lies about 4 cables northward of Bool.

Toempangan (Tumpangan) and Boloh lie together on a reef, which dries, about one mile northward of Bool; owing to the 1¼-fathom ($2^{m}3$) reef just mentioned, the passage between Toempangan and Bool (*Lat. 1° 03′ N., Long. 120° 40′ E.*) is unsafe. Pamanoekan (Pamanukan), about 8 cables east-north-eastward of Toempangan, is a very prominent rock, with a white top due to birds, and is visible about 7 miles in clear weather; a reef, with a depth of 2 fathoms ($3^{m}7$) over it, lies about 7 cables north-north-eastward of Pamanoekan.

There is usually a stream setting between south and south-east in the vicinity of these islands, but between Sematan and Kapetan a north-going stream is often experienced.

Chart 2662, plan of Baai van Toli Toli.

Baai van Toli Toli.—Light.—Anchorage.—Baai van Toli Toli is entered between Tanjong Toli Toli, a low point covered with mangroves, and Tanjong Laboean Dedah, a steep rocky point about 1¼ miles north-north-eastward. The bay is free from dangers, but the depths decrease rapidly within the 10-fathom ($18^{m}3$) line. The shore is mostly fringed by a sandy beach, drying out for about 2 cables; several streams flow into the bay, but they can only be entered by boats at high water. Naloe village where the native prince of the district resides, is situated on the southern shore; Baroe village, the headquarters of a Government official and a place of export, is situated at the head of the bay.

Latoengan (page 457), lying off the entrance, is fringed by a reef which extends about 3 cables from its southern side. The passages northward and southward of the island are safe, but with bad visibility, and when the reefs are not plainly visible the northern passage is preferable, taking care to give the northern extremity of the island a good berth. Vessels approaching from north-westward should pass about one mile northward of Pamanoekan.

The roadstead lies eastward of the meridian of Tanjong Laboean Dedah.

The usual anchorage is off the northern end of Baroe village, in a depth of about 17 fathoms ($31^{m}1$).

A light is exhibited, at an elevation of 13 feet ($4^{m}0$), from a wooden post, 13 feet ($4^{m}0$) in height, at Tanjong Laboean Dedah.

There is a landing pier at Baroe village, suitable for light craft only. The bay is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3394.

Coast.—The coast between Tanjong Laboean Dedah and Stroomenkaap, about 16 miles northward, is high and forms several rocky points, with sandy beaches in the bights between.

Charts 2636, 941b, 942a, 1263.

Chart 3394.

Tanjong Kekoh, about 3½ miles northward of Tanjong Laboean Dedah, is a rocky point rising to a hill, 561 feet ($171^{m}0$) high ; a detached reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies close offshore about 1¼ miles northward of this point, and one mile farther northward is a rock above water on the coastal reef.

Tendeh, an islet covered with light green reeds showing plainly against the dark green background, lies on a reef, which partly dries, extending from a point about 3½ miles northward of Tanjong Kekoh. Good anchorage can be obtained in the bay between Tendeh and Tanjong Kambol, about 3¼ miles north-north-eastward ; a steep-to mudbank extends from the shore in the southern part, and a 4-fathom ($7^{m}3$) patch lies near the head of the bay.

Off-lying dangers.—Pasie Lolah, a reef which partly dries, lies about 2 miles northward of Pamanoekan (*Lat. 1° 05′ N., Long. 120° 42′ E.*). Pasie Boeloe (Bulu) Mata, with a least depth of 7 fathoms ($12^{m}8$) over it, and Pasie Dalanang, which dries 3 feet ($0^{m}9$), lie about 5½ miles north-westward and 5¾ miles north-north-westward, respectively, of Pamanoekan. Pasie Batang, with a depth of 3¼ fathoms ($5^{m}9$) over it, and Pasie Sinoat, with a depth of 6 fathoms ($11^{m}0$) over it, lie about 3¾ miles westward and 2½ miles north-westward, respectively, of Tendeh. The discoloration of these two reefs can only be seen at a very short distance.

Pasie Besar comprises a group of reefs, which partly dry, lying about 4½ miles west-north-westward of Tanjong Kambol. Pasie Kambala, with a depth of 2¾ fathoms ($5^{m}0$) over it, and Pasie Seloempis (Selumpis), with a depth of 6½ fathoms ($11^{m}9$) over it, lie about 4 and 3 miles, respectively, westward of Tanjong Lambagoe (Lambagu), situated about 2½ miles northward of Tanjong Kambol.

All the dangers mentioned above, except Pasie Lolah, lie close within the 100-fathom ($182^{m}9$) line.

Baai van Kapas.—Anchorage.—Baai van Kapas, entered about 1½ miles northward of Tanjong Lambagoe, affords well-sheltered anchorage, in depths of from 15 to 17 fathoms ($27^{m}4$ to $31^{m}1$), sand. Kapas, an islet which does not show up well against the coast behind, lies on a reef close westward of the southern entrance point of the bay ; the western side of the islet is the highest and most densely wooded. At the south-eastern corner of the bay is Kapas village, northward of which the shore is flat, covered with mangroves and fringed by a reef which extends from one to 3 cables offshore. When the reefs are clearly visible the bay can be entered from southward by the narrow, but deep passage between Kapas islet and the mainland ; the southern entrance point of the bay may be rounded for the anchorage as soon as the mouth of the creek in the middle of Kapas village bears 115°.

Charts 2662, plan of Reede Lingadang and Baai van Belonlioh, 3394.

Straat Kapas.—Light.—Straat Kapas separates the Celebes coast between Kapas islet and Stroomenkaap, on the east, and Pasie Salando on the west. The latter is a narrow coral reef with its southern extremity lying about one mile westward of Kapas islet ; many parts of the reef dry 3 feet ($0^{m}9$), and at low water spring tides is almost entirely dry. At its northern extremity are the two Salando eilandjes, entirely different in appearance, the western being 79 feet ($24^{m}1$) high and bare, and the eastern, 138 feet ($42^{m}1$) high, and covered with dark vegetation.

A light is exhibited, at an elevation of 148 feet ($45^{m}1$), from a white

Charts 2636, 941b, 942a, 1263.

Charts 2662, plan of Reede Lingadang and Baai van Belonlioh, 3394.

iron framework structure, 46 feet ($14^{m}0$) in height, on the eastern Salando eilandje.

Stroomenkaap or Tanjong Besar (*Lat. 1° 20′ N., Long. 120° 49′ E.*), the north-western extremity of Celebes, is a remarkable rocky bluff fringed by a coral ledge, which extends about 2 cables offshore; on its extremity is a small wood, which appears as an islet when first sighted. Within this wood the cape rises regularly to Lakopamea, 1,545 feet ($470^{m}9$) high, which has a flat summit, except from northward, when it appears conical; about 2½ miles farther southward is Sikala, a mountain with a sharp summit, 1,870 feet ($569^{m}9$) high. *See* view on chart 2636 and facing page 445.

For the north coast of Celebes, eastward of Stroomenkaap, *see* page 619.

Directions.—Current.—Straat Kapas is a safe, deep passage, and easy to navigate when the reefs are plainly visible. Vessels bound eastward, after proceeding through the strait from southward, should not round Stroomenkaap until the western Salando eilandje opens northward of the eastern islet. A current, sometimes attaining a rate of 2 knots, may be expected setting northward or southward, both in the strait and outside the islets; outside the northern entrance there is frequently a short and turbulent sea, even with very little wind.

Charts 2636, 941b, 942a, 1263.

CHAPTER XIV

EAST COAST OF BORNEO, FROM TANJONG MANGKALIHAT TO TANJONG AHOES

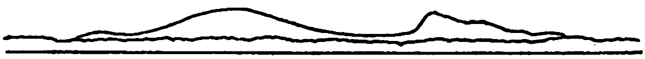
Chart 2636.

TANJONG MANGKALIHAT TO BERAOE RIVIER.—Coast.—The east coast of Borneo between Tanjong Mangkalihat (page 417) and the mouth of the Beraoe (Berau) rivier, about 90 miles north-westward, is mostly low and covered with mangroves; in the south-eastern part, between Tanjong Mangkalihat (*Lat. 1° 01′ N., Long. 118° 59′ E.*) and Telok Seliman, about 15 miles north-westward, the mountains approach close to the coast, which is rocky, and there is another high, rocky part near Tanjong Domaring, about 46 miles farther north-westward.

An extensive triangular coral formation, with very irregular depths over it, extends from the coast between Telok Seliman and Tanjong Samoentai (Samuntai), about 30 miles north-westward; the northern side of this triangular formation is formed by a raised ridge, drying in many places, and having a few islets on it; the outer islet, Bilang Bilangan, lies near the apex of the triangle and 33 miles eastward of Tanjong Samoentai.

Climate and weather.—*See* page 17.

Mountains.—Antoe gebergte and Kanioengan (Kaniungan) gebergte, lying near the coast between Tanjong Mangkalihat and Telok Seliman, are noticeable from north-eastward; the latter consists of several peaks close together, the highest attaining an elevation of 2,559 feet ($780^{m}0$) and being conical in shape (*see* view facing page 470). Brioen (Briun), a mountain about 25 miles south-westward of Tanjong Domaring, has two summits; the south-eastern of these is rounded and 3,051 feet ($929^{m}9$) high, and the north-western is steep on its south-eastern side.



Brioen, bearing 236°, distant 50 miles.

(*Original dated* 1931.)

Northward of Brioen is Kalksteen (Limestone) gebergte, a long ridge running parallel with the coast, and having a rugged crest attaining an elevation of 3,642 feet ($1,110^{m}1$), with numerous white patches on the slopes; the south-eastern end of this ridge terminates in hilly

Charts 941b, 2660b, 1263.

Chart 2636.

land, and the north-western end is steep. In front of this range a line of hills extends in a north-westerly direction from Tanjong Domaring; the most prominent summits of this ridge are Babagoenoeng (Babagunung), 591 feet ($180^{m}1$) high, Badjoe (Baju) and Taballar. Simroet (Simrut), about 11 miles north-westward of Taballar, does not stand out clearly against the background; about 6 miles west-north-westward of Simroet is Suikerbrood, a mountain in the shape of a sugar-loaf, 1,722 feet ($524^{m}9$) high. Padai, about 8 miles northward of Suikerbrood, is the most noticeable of a group of hills lying close southward of the delta of Beraoe rivier; this hill and Soewaran (Suwaran), a mountain, 4,036 feet ($1,230^{m}2$) high, of peculiar shape, about 19 miles south-westward, are visible from near Karang Malaloengoen (page 467) in clear weather. Samiroa, about 2 miles north-north-eastward of Padai, is an isolated, dome-shaped hill, 344 feet ($104^{m}8$) high, situated close to the southern bank of Muara Pantai. *See* views facing pages 470, 471.

Inaran gebergte, with its northern end about 12 miles westward of Padai, has a very rugged crest without any conspicuous peaks. Njapa gebergte, south-westward of Inaran gebergte, is plainly visible in clear weather from the vicinity of Pandjang (page 468), north-eastward of the mouth of Beraoe rivier. *See* view facing page 471.

Local winds.—The coast between Tanjong Mangkalihat and Tanjong Giring Giring, about 17 miles north-westward, is noted for sudden squalls coming down from the high land.

Chart 3031, plan of Kaniungan islands.

Coast.—Dangers.—The coast at Tanjong Mangkalihat is covered with mangroves; farther north-westward it becomes rocky. Batu Belobang (*Lat. 1° 03′ N., Long. 118° 57′ E.*) is a very prominent rock lying on the narrow coastal reef about 3¼ miles north-westward of Tanjong Mangkalihat, and has a gap in it, open in an east and west direction.

Telok Soembang (Sumbang), entered about 5 miles westward of Batu Belobang, affords anchorage close to the shore at the head of the bay, off a small village situated at the mouth of a rivulet; elsewhere the depths are very great, and the 100-fathom ($182^{m}9$) line is nowhere more than half a mile from the shore. The sides of the bay are steep and rocky. Tanjong Kapala, the north-western entrance point of Telok Soembang, is situated about 7½ miles west-north-westward of Batu Belobang.

Telok Seliman, about 5 miles north-westward of Tanjong Kapala, is very narrow, but affords sheltered anchorage, in depths of from 6 to 9 fathoms ($11^{m}0$ to $16^{m}5$), soft mud. There are two high islands close to the coast southward of the entrance; there is a least depth of 5½ fathoms ($10^{m}1$) in the entrance, which is contracted by reefs extending from the northern island and the northern entrance point of the bay, and it should only be attempted at low water, when the reefs are visible. There is a settlement of a timber company in Telok Seliman.

Kanioengan (Kaniungan) eilanden are two coral islands lying on the south-eastern side of a nearly circular coral reef, with very irregular depths up to 20 fathoms ($36^{m}6$) over it, and separated from the coast between Tanjong Kapala and the entrance to Telok Seliman by a clear channel from one to 2 miles wide, with depths of over 100 fathoms

Charts 941b, 2660b, 1263.

Chart 3031, plan of Kaniungan islands.

(182^{m}9). Kanioengan besar, the south-western island, is 92 feet (28^{m}0) high, and is covered with coconut trees; Kanioengan kechil is lower, but is visible 10 miles owing to the high coconut trees on it. Fairly sheltered anchorage can be obtained off the south-western edge of the reef, which dries, fringing Kanioengan kechil, in a depth of 7 fathoms (12^{m}8), sand.

There are numerous shoal patches on the reef surrounding the Kanioengan eilanden, the positions of which can best be seen on the chart.

A bank, with a depth of 11 fathoms (20^{m}1) over it, was reported, in 1943, to lie about 6½ miles north-north-eastward of Kanioengan kechil, outside the 100-fathom (182^{m}9) line.

The coast between the entrance to Telok Seliman and Tanjong Kalindakkan (chart 2636), about 18 miles north-westward, is low and covered with mangroves; Tanjong Giring Giring, about 2 miles northward of Telok Seliman, is noticeable from northward, as the hills approach the coast here. About 2¾ miles north-westward of Tanjong Giring Giring is Bidoek Bidoek, a large village, in which there is a mosque, and about 3¼ miles farther in the same direction is the entrance to a small creek named Labuan Klamboe (Klambu), but, as the coastal reef broadens out here, it can only be entered at high water by native boats; a reef, with a depth of one fathom (1^{m}8) over it, not marked by discoloration, lies about 1½ miles north-eastward of the entrance to Labuan Klamboe.

Off-lying reefs.—Beacon.—The channel along the coast between Tanjong Giring Giring and Tanjong Kalindakkan has very irregular depths, but, except for the one-fathom (1^{m}8) reef off Labuan Klamboe, all the dangerous reefs lie fully 5 miles from the coast and almost on the line joining Kanioengan kechil and Balik Koekoep (page 464); vessels proceeding by day between Tanjong Mangkalihat and Beraoe rivier frequently steer a course parallel with and close outside this line.

Taka Sangalan, about 7 miles northward of Tanjong Giring Giring, has a small drying portion on its western side; a beacon surmounted by a white ball, stands on the drying part of Taka Sangalan (*Lat. 1° 19′ N., Long. 118° 47′ E.*). About 3 miles eastward of the beacon is a reef with a least depth of 5½ fathoms (10^{m}1) over it.

Chart 3031, plan of Buaya and Manimbora anchorages.

Taka Lintjang (Linchang), about 8½ miles east-north-eastward of Tanjong Kalindakkan, has a least depth of 2¾ fathoms (5^{m}0) over it and is generally marked by discoloration; there are, however, numerous patches of false discolorations in the vicinity. Several patches, with a least depth of 3¼ fathoms (5^{m}9) over them, lie about midway between Taka Lintjang and Tanjong Kalindakkan; a reef, with a depth of 2 feet (0^{m}6) over it, lies about 1½ miles southward of Taka Lintjang, a 2½-fathom (4^{m}6) patch lies about 3¾ miles south-south-eastward of Taka Lintjang, and a 2¾-fathom (5^{m}0) patch and a 5½-fathom (10^{m}1) patch lie about 2½ and 3½ miles northward, respectively, of Taka Lintjang.

Anchorage.—Tandjoeng Boeaja Boeaja (Buaya Buaya) is a low densely wooded island, with one large tree in the middle, lying about 2¼ miles west-north-westward of Tanjong Kalindakkan; it is separated from the coast by a narrow channel much encumbered by reefs; a reef, which dries, on which there are mangroves, extends about 2½ miles

Chart 3031, plan of Buaya and Manimbora anchorages.

from the north-eastern side of the island. The village of Boeaja Boeaja (Buaya Buaya) is built on piles on the north-western extremity of the island, and can only be reached at high water.

Well-sheltered anchorage can be obtained in the bay westward of Tandjoeng Boeaja Boeaja, with the village bearing 090°, distant 8 cables, in depths of from 10 to 12 fathoms (18^m3 to 21^m9); this bay is entered between the reef extending northward from Tandjoeng Boeaja Boeaja and that extending from Tanjong Samoentai (page 461). The anchorage can only be reached safely at low water, when the reefs are plainly visible, and the bay should not be penetrated farther than with the village bearing 090°, as several reefs lie southward of that bearing; the bay is approached through the channel southward of Karang besar (*see* below). Batoe Poetih (Batu Putih) village is situated at the mouth of Sungei Batoe Poetih (Batu Putih), which flows into the head of the bay. The western shore of the bay is low, marshy and covers at high water.

Manimbora, about 3½ miles eastward of the northern extremity of Tandjoeng Boeaja Boeaja and close off the north-eastern edge of the reef extending from this island, is a low islet covered with tall coconut trees, and is visible 10 miles in clear weather.

Chart 2636.

Off-lying reefs and islets.—Beacons.—Karang besar is an extensive reef, most of which dries, lying northward of Tandjoeng Boeaja Boeaja; some detached patches lie off its northern side. Balik Koekoep (Kukup), (*Lat. 1° 32′ N., Long. 118° 38′ E.*), a low islet wooded with high trees, visible 14 miles, lies close within the eastern extremity of Karang besar. A white beacon, surmounted by a ball, marks the eastern extremity of Karang besar, and a similar beacon marks the north-eastern edge; in 1931, a shoal, with a depth of 1½ fathoms (2^m7) over it, was reported to lie about 2½ miles north-eastward of the latter beacon.

From the eastern extremity of Karang besar a narrow ridge, with general depths of from 4 to 10 fathoms (7^m3 to 18^m3) over it, extends about 20 miles eastward; this ridge is very steep-to on the northern side, with depths of over 100 fathoms (182^m9) about a quarter of a cable from the edge. A reef, which dries, known as Karang Daengalahan, lies on the northern side of this ridge and about 9 miles eastward of Balik Koekoep; a 2¾-fathom (5^m0) patch lies about 2 miles southward of Karang Daengalahan. Mataha and Bilang Bilangan, on the eastern end of the ridge, are low islands covered with coconut trees, visible from 13 to 14 miles; the latter island is occasionally visited by vessels of the Koninklijke Paketvaart Maatschappij. Anchorage may be obtained by vessels with local knowledge off Bilang Bilangan, in a depth of about 15 fathoms (27^m4), with a house on the beach bearing 320°, and the western extremity of the island, 278°. The anchorage should be approached with the house bearing 320°. There are several passages over the ridge, but the one most generally used lies immediately eastward of Karang besar.

Chart 3031, plan of Buaya and Manimbora anchorages.

Channel southward of Karang besar.—Beacons.—There is a channel, with depths of from 9 to 16 fathoms (16^m5 to 29^m3), between the south-western side of Karang besar and the reefs extending from Tandjoeng Boeaja Boeaja and Tanjong Samoentai. Manimbora, *Chart 3031, plan of Buaya and Manimbora anchorages.*

described above, lies on the southern side of the eastern entrance, and a 2¾-fathom ($5^{m}0$) patch, not marked by discoloration, lies on the northern side of this entrance and 1½ miles east-north-eastward of Manimbora.

A beacon, surmounted by a white ball, stands close within the southern extremity, and another, surmounted by a white cylinder, on the south-western extremity of Karang besar.

A beacon, surmounted by a black truncated cone, stands on the north-western extremity of the reef on the southern side of the channel about 4 miles west-north-westward of Manimbora.

From eastward or south-eastward the channel can be reached by three different routes: (*a*) Along the coast from Tanjong Mangkalihat; (*b*) eastward of Kanioengan kechil and thence south-westward of Taka Sangalan; (*c*) northward of Taka Lintjang. When nearing the eastern entrance to the channel a vessel should steer 297° to pass midway between the reef extending from Manimbora and the 2¾-fathom ($5^{m}0$) patch north-eastward; when Manimbora (*Lat. 1° 28′ N., Long. 118° 32′ E.*) bears about 180°, course should be altered to 284°, until that islet bears 119°, when it should be kept astern on this bearing through the remainder of the channel.

Charts 941b, 2660b, 1263.

Approaching the channel from north-westward, Manimbora will be sighted in clear weather before the vessel reaches the outer reefs of Karang besar; if Manimbora is not visible the utmost caution should be exercised to keep in the channels between the reefs in the entrance.

Current.—Close outside Karang besar, as well as southward of that reef, a constant current sets south-south-eastward to south-eastward, at an average rate of one knot, sometimes decreasing to half a knot and occasionally attaining 2½ knots.

Chart 2636.

Coast.—The coast between Tanjong Samoentai and Tanjong Boeassin (Buassin), about 43 miles north-westward, is low and monotonously wooded, except for Tanjong Domaring (page 461), where the hills approach the coast. Sungei Domaring flows out about 3 miles south-eastward of Tanjong Domaring, and there is a small settlement a short distance up the river.

Sungei Taballar flows out through two mouths, one on each side of Tanjong Peroepoe (Perupu), a low, but prominent point nearly 11 miles north-westward of Tanjong Domaring. The southern mouth is named Sungei Biattan; the northern mouth is easily identified by an islet, wooded with high trees, in the middle of the entrance. Small craft, with a draught of from 5 to 7 feet ($1^{m}5$ to $2^{m}1$), can proceed up to Taballar village, a few miles up, but the river must be entered at high water, as the channel over the bank outside the mouth is very narrow; within the river a depth of 2¾ fathoms ($5^{m}0$) can be carried up to the village.

Sungei Simroet (Simrut), on which Simroet village is situated, flows out about 5½ miles southward of Tanjong Boeassin, and the depth is the same as in Sungei Taballar.

OUTLYING ISLANDS AND DANGERS.—Moearas rif.—Light.—Moearas (Muaras) rif lies with its southern end about 11 miles

Charts 941b, 1263.

Chart 2636.

northward of Bilang Bilangan, and its outer edge dries; an opening at the south-eastern end leads to a deep basin within the reef, but this is too encumbered with reefs to be navigable. Except near the opening the reef is very steep-to on its outer edge, with depths of over 100 fathoms (182^{m}9) close to. Balembangan, close off the south-eastern end of Moearas rif, is a low, wooded islet visible about 11 miles; Sambit, about 2 miles eastward of Balembangan, is a sandbank covered with low trees. Karang Lintang, about 2¾ miles westward of Balembangan, is a bare sandbank. Anchorage can be obtained southward of these two islets, but care should be taken to avoid a reef, with a least depth of 1¼ fathoms (2^{m}3) over it, lying close southward of Balembangan; a reef, with a depth of 4¼ fathoms (7^{m}8) over it, lies about 2½ miles southward of Sambit. The passage westward of Sambit should not be attempted, as a 2¾-fathom (5^{m}0) patch lies in the middle of it. Karang Gosoengan (Gosungan), on the northern end of Moearas rif, is a bare sandbank.

A light is exhibited, at an elevation of 102 feet (31^{m}1), from an iron framework structure, upper half black and lower half white, 102 feet (31^{m}1) in height, on Sambit.

Maratoea.—Maratoea (Maratua), with Tanjong Dewatta, its southern end, 16 miles north-westward of Karang Gosoengan, is the raised portion of an extensive coral reef, and the highest part, which has an elevation of 394 feet (120^{m}1), is in about the middle of the western side. Several islets lie on the reef near Tanjong Bahaba (*Lat. 2° 15′ N., Long. 113° 38′ E.*), the south-eastern extremity of the island. Bakoengan (Bakungan), on the south-eastern extremity of the reef, is a low sandbank, but, owing to the vegetation on it, is visible about 10 miles; Noenoekan (Nunukan), about 6 cables northward of Bakoengan, consists of bare coral, and is from 20 to 30 feet (6^{m}1 to 9^{m}1) high.

Southward of Tanjong Bahaba there is a passage, about half a cable wide, through the reef, which is navigable for vessels about 170 feet (51^{m}8) in length, with local knowledge; the outer part of this passage runs in a west-south-westerly and east-north-easterly direction, with depths of from 9 to 12 fathoms (16^{m}5 to 21^{m}9), but farther inside, where the channel turns westward, the depths decrease to 4 fathoms (7^{m}3). Thence the passage becomes wider and deeper again, where it is known as Labuan Lakiet Langkong, and affords sheltered anchorage, with all winds, in a depth of about 6 fathoms (11^{m}0). At spring tides strong tidal streams run in and out of this passage, and there is a turbulent sea outside the entrance.

There is also anchorage westward of Tanjong Dewatta, at a convenient distance from the reef, in depths of from 25 to 30 fathoms (45^{m}7 to 54^{m}9); there is a settlement named Bonesitia, with coconut plantations, on this point. Fresh water can be obtained from a well about 2½ miles southward of Tanjong Boli Toewattan (Tuwattan), the northern extremity of the island.

Vessels should not pass close along the edge of the reef extending from Maratoea at high water, as the south-east-going current along the island, sets on to the reef, and there is a strong north-going eddy near the south-western side.

Kakaban.—Kakaban, with its southern extremity about 6 miles south-westward of Tanjong Dewatta, appears from the offing as a

Charts 2660b, 1263.

Chart 2636.

flat, wooded island; within a rocky wall, however, which forms the coast of the island and in some places is barely one cable wide, there is a large salt water lake, apparently connected with the sea in some way, as according to the natives there is a regular rise and fall in the lake. In most places the rocky wall rises very steeply from the sea, and is difficult to climb, as the narrow, surrounding rim of coral is much underworn by the action of the sea. The highest point of the island, at the south-eastern extremity, has an elevation of 295 feet ($89^{m}9$).

There are two villages, with coconut plantations, on the island, one on the west coast and the other on the east coast; with a calm sea landing can be effected on a narrow sandy beach off each village, but the depths are too great for anchoring near the island. The coastal reef nowhere exceeds half a cable in width and is steep-to.

There is a south-east-going current setting along Kakaban; it may attain a rate of 2½ knots and cause a turbulent sea against the northern end.

Karang Malaloengoen.—Light.—Karang Malaloengoen (Malalungan) lies 13½ miles south-south-westward of Kakaban, and partly dries; near this reef the bottom consists of coral, at some distance eastward, of black sand, and westward, of mud. The tidal stream usually sets south-eastward along both sides of the reef, but there is sometimes a north-going eddy along the western side; at spring tides the out-going stream from Muara Pantai (page 470), which sets east-south-eastward, is noticeable until eastward of Karang Malaloengoen.

A light is exhibited, at an elevation of 34 feet ($10^{m}4$), from a white framework structure, 26 feet ($7^{m}9$) in height, on the northern extremity of Karang Malaloengoen.

Sangalakki.—Light.—Sangalakki (*Lat. 2° 05′ N., Long. 118° 24′ E.*), about 7 miles south-westward of Kakaban, is a low islet, covered with high trees, and is visible about 14 miles; it is fringed by a reef, which extends as much as 6 cables from the eastern side.

A light is exhibited, at an elevation of 34 feet ($10^{m}4$), from a white iron beacon, 26 feet ($7^{m}9$) in height, on the south-eastern extremity of the reef fringing Sangalakki.

Samama and adjacent reefs.—Beacon.—Samama, 4¾ miles north-westward of Sangalakki, is a low island, almost entirely covered at high water, but visible about 12 miles owing to the trees on it; a small islet, with a group of trees on it, lies on the reef extending about three-quarters of a mile from the northern side of Samama.

Karang Boeli Oelin (Buli Ulin) is an extensive reef, which dries, lying close southward of Samama; the narrow channel between this reef and that extending southward from Samama should not be attempted. The north-western extremity of Kakaban in line with the south-eastern extremity of Sangalakki, bearing 057°, leads south-eastward of Karang Boeli Oelin.

In this vicinity there is a constant south-east-going current, especially outside the large drying reefs and on either side of Sangalakki, though it may be somewhat affected by the strong streams flowing out of the Beraoe delta, especially at spring tides. On a rising tide the southern end of Karang Boeli Oelin should not be approached closely, for, as soon as the reef covers, an eddy stream sets northward over it.

Three reefs lie between Samama and Derawan, nearly 10 miles

Charts 2660b, 1263.

Chart 2636.

north-north-westward: Karang Pinaka, the southern of these, appears as a white sandbank and only covers entirely at high water spring tides; the channel northward and southward of this reef should not be attempted. Karang Masimboeng (Masimbung) lies about 1¼ miles north-north-westward of Karang Pinka, and a large portion of it dries; Karang Tababinga, close westward of the northern part of Masimboeng, only dries at exceptionally low water, and the north-western part, with depths of less than 5 fathoms (9^{m}1) over it, extends about three-quarters of a mile beyond the visible edge. The passage between Tababinga and Masimboeng is clear of dangers and deep, and can be used by vessels with local knowledge when the reefs are clearly visible.

A black beacon, surmounted by a truncated cone, stands on the northern extremity of Karang Tababinga.

Derawan.—Beacons.—Derawan is a low coral islet, inhabited, and planted with coconut trees, with a few very high trees on it visible from 14 to 16 miles; the reef, on which it lies, extends one mile eastward and 2½ miles westward, but on the north and south sides is little more than one cable wide.

There are navigable channels for vessels with local knowledge, both northward and southward of Derawan, with anchorage in both, when the reefs are clearly visible, in a depth of about 25 fathoms (45^{m}7); from November to May vessels should anchor southward of the island, and during the other months northward of it. The northern side of the southern channel, known as Derawan passage, is marked by two white beacons with ball topmarks, one placed on the south-eastern extremity of the reef extending eastward from Derawan, and the other on the edge of the reef southward of the islet; the southern side of the channel is marked by the black beacon on the north-eastern extremity of Karang Masimboeng and by the black beacon on Karang Tobabinga (*Lat. 2° 16′ N., Long. 118° 14′ E.*). The tidal streams in Derawan passage attain a rate of 2 knots.

Pandjang and Raboe Raboe.—Pandjang (Panjang), about 4 miles north-north-westward of Derawan, is a low island, partly covering at high water, with high trees on it visible about 16 miles. The island stands on the south-eastern part of an extensive reef, which dries, and very steep-to on its eastern side.

Raboe Raboe (Rabu Rabu), about 5 miles west-south-westward of the southern extremity of Pandjang, is also partly covered at high water, but some tall trees on it are visible about 14 miles. There are navigable channels on either side of Raboe Raboe, but the reefs should be clearly visible, and local knowledge is also necessary. The eastern of these channels, between Raboe Raboe and the reef extending westward from Pandjang, is much encumbered by shallow heads at the southern end; the western channel is marked by unofficial beacons.

MOUTHS OF BERAOE RIVIER.—In the approach to Beraoe (Berau) rivier is an extensive estuary, formed by many uninhabited islands, with various passages between them. The islands are low, monotonously wooded, and without any distinctive features visible from seaward, and the channels through the estuary are only suitable for small vessels with local knowledge. The 10-fathom (18^{m}3) line

Charts 2660b, 1263.

Chart 2636.

lies from about 10 to 12 miles eastward of the outer islands, and between it and the shoals in the estuary the depths decrease rapidly.

The principal channel of approach leads through Muara Goentoeng (Guntung) and thence through the upper reaches of Muara Garoera (Garura) and Muara Tidoeng (Tidung). There are also navigable approaches through Muara Pantai, on the southern side of the estuary, and Muara Tidoeng on the northern side.

Owing to the muddy water the shoals and banks off the delta are not marked by discoloration; vessels should not, therefore, proceed into a depth of less than 16 fathoms (29^{m}3) until the buoys off the mouths of the delta have been identified, otherwise they may enter one of the many deep gullies scoured out by the flood tide.

Depths.—The least depths at mean water level, which is 6 feet (1^{m}8) above low water spring tides, in the principal arms of the delta up to Sokkan village, where these arms unite at the entrance to Beraoe rivier, are as follows:—

Muara Pantai:	channel through the outer bank . . .	23 feet (7^{m}0), in 1924.
„ „ :	bar by Sodang besar .	3 feet (0^{m}9), in 1946.
„ „ :	bar by Sodang kechil .	12 feet (3^{m}7), in 1936.
Muara Goentoeng:	channel through the outer bank . . .	17 feet (5^{m}2), in 1928.
„ „ :	river arm . . .	19 feet (5^{m}8), in 1928.
Muara Garoera:	bar south-eastward of Sodang besar . .	17½ feet (5^{m}4), in 1941.
Muara Tidoeng:	channel through the outer bank . . .	24 feet (7^{m}3), in 1924.
„ „ :	bar southward of Badak Badak . . .	9 feet (2^{m}7), in 1925.
„ „ :	between Muara Garoera and Sokkan village, on the bar by Pulau Baroe	18 feet (5^{m}5), in 1930.
Bar by Sokkan:	dredged channel maintained by the Koninklijke Paketvaart Maatschappij . . .	10 feet (3^{m}0), in 1948.

Elsewhere a least depth of 16 feet (4^{m}9) can be reckoned on, at mean water level, in the main channel through Muara Goentoeng and thence through the upper reaches of Muara Garoera and Muara Tidoeng up to Sokkan village (*Lat. 2° 11′ N., Long. 117° 41′ E.*). A vessel with a draught of 16 feet (4^{m}9) can safely reach Tandjoeng Redeb and Telok Bajoer, about 15 and 20 miles, respectively, above Sokkan, at high water.

Tidal streams.—The influence of the water running in and out of Beraoe rivier is strongly felt up to far outside the banks off the delta. The change of the stream from out-going to in-going occurs 1½ hours after the time of low water; the out-going stream lasts about 7 hours, and the in-going stream about 5 hours. The change of the stream from in-going to out-going occurs about the same time as high water. The maximum rate of the out-going stream at spring tides is about 3 knots, and that of the in-going stream about 2 knots.

Directions.—The main route from Macassar strait to Beraoe rivier passes eastward of Tanjong Mangkalihat, thence eastward of

Charts 2660b, 1263.

Chart 2636.

Bilang Bilangan, and through the channel between this islet and Moearas rif; vessels can then pass either northward or southward of Karang Malaloengoen.

The inshore channel, which forms the direct route from Tanjong Mangkalihat to Beraoe rivier has been described on page 464.

Muara Pantai.—Beacons.—Buoyage.—Muara Pantai, the southern arm of the delta of Beraoe rivier, is approached by a channel through the bank of the delta, about 12 miles long; between Tanjong Boeassin (page 465) and Tanjong Birai, 5 miles north-north-eastward, the entrance channel narrows to about 3 cables and runs in a westerly direction along the southern side of the island Loensoeran (Lunsuran) Naga; thence it turns northward, running along the western sides of that island and Sodang besar, to the entrance of Beraoe rivier off Sokkan village. Tanjong Birai, the northern entrance point, is fairly prominent, as the high trees on it are farther apart than is the case with the closely wooded land in the vicinity. *See* view facing this page and page 471.

Muara Pantai is now seldom used, and no directions will be given.

A black and red chequered conical buoy, surmounted by a cone, is moored about 10½ miles eastward of Tanjong Boeassin, and marks the approach channel to Muara Pantai.

A white conical buoy, surmounted by a ball, moored about 2 miles north-eastward of Tanjong Boeassin, marks the northern side of the channel.

Two beacons, equipped with reflectors, one on each side of the river, serve as crossing-over marks for the bar in the channel westward of Sodang besar; this is known as the Lingard crossing. The western beacon was reported, in 1946, to have disappeared.

Trusan Koembang.—Beacons.—Trusan Koembang runs between the north-western side of Loensoeran Naga and the southern side of Sodang besar, and connects Muara Pantai with the principal channel of Beraoe rivier, described on page 471. The channel, which is shallow, is marked by two unofficial beacons, each surmounted by a cone.

Muara Goentoeng.—Buoyage.—Beacons.—From the outer edge of the delta bank the entrance to Muara Goentoeng is difficult to identify, and vessels should not proceed into a depth of less than 16 fathoms ($29^{m}3$) until the approach buoy has been sighted. (*See* view facing this page.) This buoy, moored about 12¾ miles eastward of Tanjong Birai, is conical and painted in red and black vertical stripes, and surmounted by a ball; it marks the southern side of the entrance to the outer part of Muara Goentoeng.

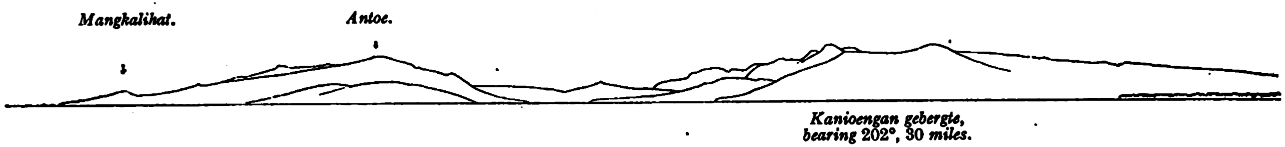
Two white conical buoys, each surmounted by a ball, lie on the northern side of the channel, about 9½ miles eastward and 3 miles east-north-eastward, respectively, of the eastern extremity of Goentoeng, and a black can buoy, surmounted by a cone, lies on the southern side of the channel about 5½ miles eastward of the same point.

Two iron beacons, each surmounted by a black cylinder, stand about 6 miles east-south-eastward and 10 miles eastward, respectively, of Tanjong Birai (*Lat. 2° 03′ N., Long. 117° 55′ E.*).

The channel runs close northward of the eastern extremity of Goentoeng and thence between Goentoeng and Lalawan, an island close northward; this part of the channel is still named Muara Goentoeng, and is only about one cable wide in places.

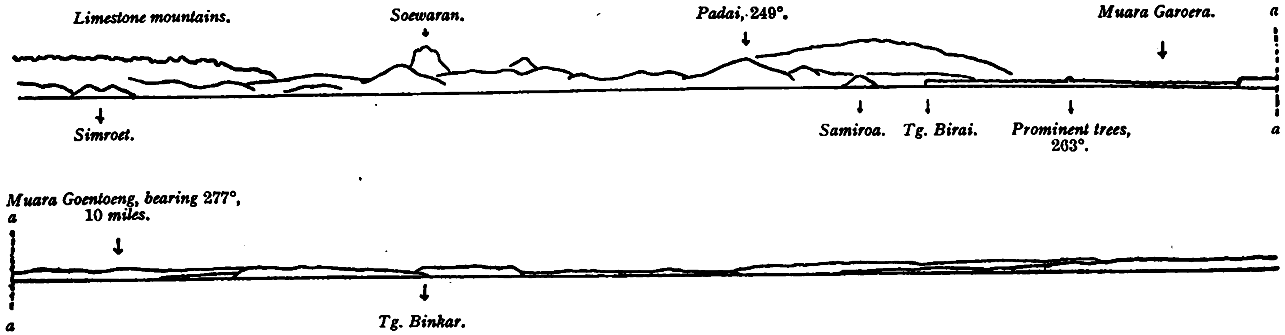
Charts 2660b, 1263.

To face page 470.



Borneo, east coast. Mountains near Tanjong Mangkalihat.

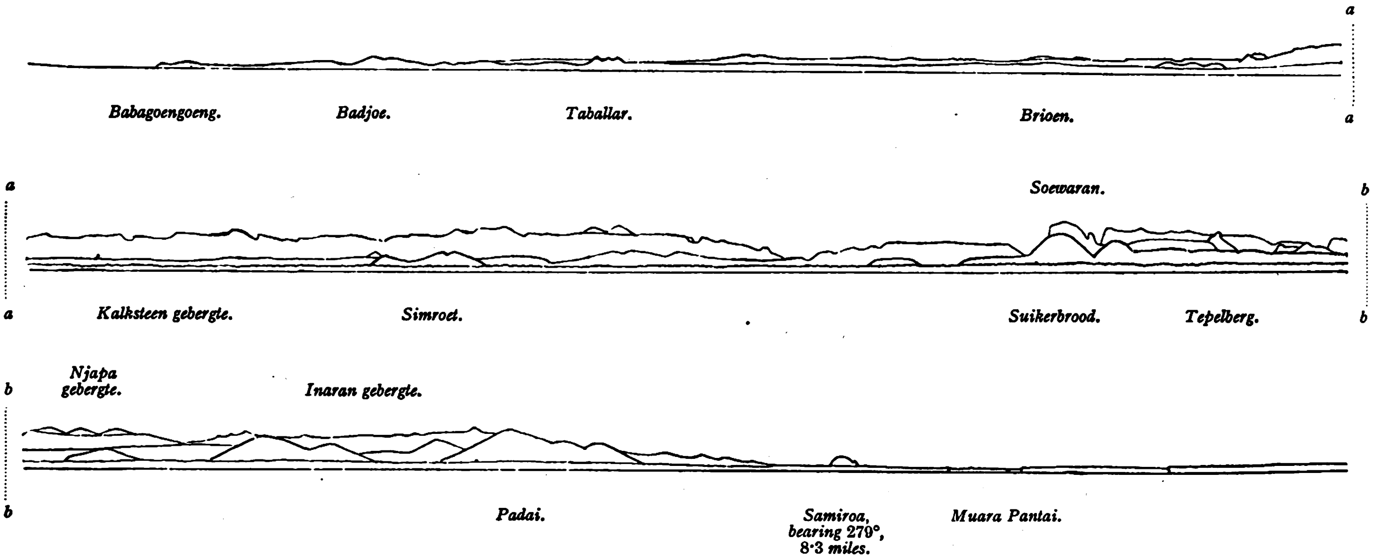
(*Original dated* 1931.)



View, in two parts, of the eastern approach to Beraoe rivier.

(*Original dated* 1931.)

To face page 471.



View, in three parts, of eastern approach to Muara Pantai.

(*Original dated* 1947.)

Chart 2636.

From the western extremity of Goentoeng the channel runs in a northerly direction through the upper reach of Muara Garoera, which separates the western side of Lalawan from the eastern side of Sodang besar. At Tanjong Lalawan, the north-western extremity of Lalawan, Muara Garoera enters Muara Tidoeng, and the channel turns abruptly westward, passing along the northern side of Telassau, an island, situated close off the northern side of Sodang besar. Baroe (Baru), a narrow, wooded islet, lies close off the north coast of Telassau; the fairway here passes southward of a rock, with a depth of only about one foot ($0^{m}3$) over it, lying nearly in the middle of the river.

Beacons or buoys, several of which are unofficial, are established in the inner part of Muara Goentoeng, in the upper reach of Muara Garoera, and in the channel northward of Baroe.

Tidal streams.—Tide-gauges.—Between the outer buoy and the black mooring buoy the direction of the tidal streams practically conforms with that of the channel; nearer the coast the in-going stream sets west-north-west, and the out-going stream east-south-east.

A tide-gauge, marked in feet, stands on a white beacon, surmounted by a cone, in Beraoe rivier northward of Sokkan village; this tide-gauge gives 2 feet ($0^{m}6$) less depth than in the dredged channel through the bar off Sokkan, and is privately maintained. A tide-gauge, marked in feet and giving the least depth in the Sokkan channel, has been placed on the southern bank, just above Sokkan village; it was reported, in 1947, to have disappeared. There is sufficient depth and ample swinging room here in case vessels are obliged to anchor to await a favourite tide.

Muara Tidoeng.—Muara Tidoeng, the northern arm of the Beraoe delta, is seldom used, as the bar by Badak Badak, a few miles within the entrance, is an obstruction to vessels of any draught. Tanjong Bolalang (*Lat. 2° 15′ N., Long. 118° 04′ E.*), on the northern side of the entrance and about 11 miles north-eastward of Tanjong Binkar, the eastern extremity of Lalawan, is low and covered with high trees. Tanjong Oelingan (Ulingan), about 5 miles south-westward of Tanjong Bolalang, is prominent from eastward, being of sand, while the adjacent land is marshy; there is a settlement near this point.

Muara Tidoeng can be entered by keeping Derawan astern, bearing 064°; local knowledge is essential for proceeding up this arm.

BERAOE RIVIER.—Above Sokkan, Beraoe (Berau) rivier has a general westerly direction for 15 miles to Tandjoeng Redeb, where it divides into two branches, named Sungei Makam and Sungei Kelai.

The navigable channel between Sokkan and Tandjoeng Redeb, also that portion of Sungei Makam between Tandjoeng Redeb and Teloek Bajoer, a coaling place about 5 miles farther up, is marked by lights, buoys, and beacons; local knowledge is necessary for proceeding up the river.

About 7 miles above Sokkan the main river westward of the island of Sapinang besar is blocked by a flat, which partly dries, and the navigable channel is through a narrow passage known as Kleine Kali, eastward and southward of Sapinang besar; this passage had a least depth, in 1938, of 17 feet ($5^{m}2$) at mean water level, and was sufficiently wide to allow vessels to pass each other. About 3 miles above Sapinang besar a shoal flat, named Hadji bank, marked by beacons,

Charts 2660b, 1263.

occupies a great portion of the width of the river; the main channel runs southward of this bank, and had a least depth, in 1947, of 8 feet (2m4) at mean water level, and the channel northward had a depth of 12 feet (3m7), in 1938. Elsewhere there is a least depth of 15 feet (4m6) thence to Teloek Bajoer.

Three privately maintained tide-gauges, one situated about one mile below Hadji bank and two above, indicate the depth of water in the channel southward of Hadji bank.

The river is generally covered in the mornings by a dense fog, which is, however, very local and is seldom encountered below Santoel (Santul), a hill, situated about 5 miles above Sokkan.

Tandjoeng Redeb.—Navigation signals.—Tandjoeng Redeb is the headquarters of a Government official and is a loading place for coal from the adjacent mines; there is also a brisk trade in forest produce. The Government wharf, 130 feet (39m6) long and with a depth of 16 feet (4m9) alongside, fronts the Customs office. There are also wharves at the junction of Sungei Makam and Sungei Kelai. Vessels lying in the roadstead, which is bounded by the parallel 2° 10′ 13″ N. and by the meridian 117° 28′ 50″ E. can take in coal from praus. If not going alongside a wharf, a vessel should anchor near the right bank, off the mosque, in order to leave the channel clear.

Tandjoeng Redeb (*Lat. 2° 10′ N., Long. 117° 29′ E.*) is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Submarine telephone cables cross the river here.

Teloek Bajoer.—Teloek Bajoer is a coal loading place for the Koninklijke Paketvaart Maatschappij; the settlement is situated on the southern bank of Sungei Makam. There is a harbour doctor.

The following tidal stream signals are shown at Teloek Bajoer:—

By day:	
A cylinder, with a cone, point up, above it, and a cone, point down, below .	slack water.
A cylinder, with a cone, point up, above it .	in-going stream.
A cylinder, with two cones, points up, above it	strong in-going stream.
A cylinder, with a cone, point down, below it	out-going stream.
A cylinder, with two cones, points down, below it	strong out-going stream.
At night:	
Three *white* lights, disposed horizontally	slack water.
Three *white* lights, disposed in the form of a triangle, point up	in-going stream.
Three *white* lights, disposed in the form of a triangle, point down . . .	out-going stream.

Sungei Makam and Sungei Kelai.—Sungei Makam is navigable for a vessel with a draught of 10 feet (3m0), under all circumstances, as far as its junction with Sungei Koelimantan, about 37 miles above Teloek Bajoer. Reliable native pilots can be obtained at Tandjoeng Redeb, although they have had no experience with vessels of 10 feet (3m0) draught; they know, however, which side of the river has the greatest depths, and the positions of the rocks.

Sungei Kelai is navigable for vessels with a draught of 10 feet (3m0),

Chart 2636.

under favourable conditions, as far as Lepet Hombak, a village about 23 miles above Tandjoeng Redeb. The remarks on the native pilots given for Sungei Makam also apply to Sungei Kelai.

COAST.—The coast between Tanjong Bolalang and Tanjong Batoe (Batu), 2¼ miles north-north-eastward, and thence to Tanjong Sepikat, about 32 miles north-westward, is low and monotonously wooded. About 25 miles south-westward of Tanjong Sepikat is an isolated group of mountains, the principal summits of which are Zadelberg and Kegelberg, 2,093 and 1,676 feet ($637^{m}9$ and $510^{m}9$) high, respectively.

Datoe Makoeta, situated at the mouth of Sungei Pidada and about 18 miles north-westward of Tanjong Batoe, is the only settlement along this part of the coast; the position of the village is indicated by rice fields in place of the usual forest. Tanjong Mangka Padie, about 1½ miles north-westward of Datoe Makoeta, is inconspicuous, but Tanjong Tanah goening (guning), about 5 miles farther north-westward, can be easily identified, as it is the only rocky part of this coast and when the light is favourable the yellow rocks can be seen at a considerable distance.

Off-lying reefs.—Beacon.—Raboe Raboe and Pandjang, with the surrounding reefs and channels between, have been described on page 468.

Balik Taba is a reef, which partly dries, lying about 7½ miles east-north-eastward of Tanjong Mangka Padie (*Lat. 2° 33′ N., Long. 117° 53′ E.*); a black beacon, surmounted by a cone, stands on the eastern edge of this reef. A reef, with a depth of 1¾ fathoms ($3^{m}2$) over it, lies about 3½ miles south-eastward of Balik Taba.

Several reefs, on which the sea often breaks, lie within a distance of 3 miles of the coast between Tanjong Mangka Padie and Tanjong Tanah goening, and this part of the coast should not be approached within a depth of 16 fathoms ($29^{m}3$).

Charts 3577, 2636.

MOUTHS OF BOELOENGAN RIVIER.—The delta of Boeloengan (Bulungan) rivier extends for about 30 miles northward of Tanjong Sepikat, and is fronted for a distance of about 10 miles by a bank with depths of less than 3 fathoms ($5^{m}5$) over it, outside which the depths increase rapidly. In clear weather the following mountains are visible from some distance outside the edge of this bank: Soewaran (page 462), which appears as a square, isolated mountain southward of Beraoe rivier, and Njapa gebergte, appearing as three summits of nearly equal elevation. Kegelberg and Zadelberg (page 473); Boeloengan (Bulungan) bergen, about 27 miles north-westward of Kegelberg; and Salinbatoe (Salinbatu) bergen, about 12 miles north-north-eastward of Boeloengan bergen.

The land of the delta is low, monotonously wooded, and almost covers at high water; although the trees appear in sight from a distance of from 15 to 20 miles, there are no conspicuous features. Owing to the muddy water the edge of the bank extending from the delta is not marked by discoloration; vessels should, therefore, keep in a depth of not less than 40 fathoms ($73^{m}2$) until certain of their position.

Charts 2660b, 1263.

Charts 3577, 2636.

Of the numerous arms of the Boeloengan delta only two are of any importance for shipping. Muara Makapan, northward of Pulau Mening, the south-eastern extremity of which lies about 15 miles north-north-westward of Tanjong Sepikat, connects with Sungei Boeloengan (Bulungan) through Sungei Temenggah, and forms the main channel to Tandjoeng Selor (page 475).

A pilot can be obtained from Linkas (page 478).

Chart 3577.

Depths.—The least depths at mean water level from seaward to Tandjoeng Selor where the formation of the delta begins, are as follows:—

Main entrance, through Muara Makapan, Sungei Temenggah, and Sungei Boeloengan, in 1928:

Sungei Temenggah, bar at southern entrance.	Dec., Jan., Feb.	10 feet (3^{m}0).
	March, April	9 feet (2^{m}7).
	May, June	9 feet (2^{m}7).
	July, Aug., Sept.	8 feet (2^{m}4).
	Oct., Nov.	9 feet (2^{m}7).

Crossing about 2 miles northward of Tandjoeng Selor (July, Sept.)	12 feet (3^{m}7).
Channel eastward of Tanjong Boejoe (Buju) (July, Sept.) about three-quarters of a mile northward of Tandjoeng Selor	12 feet (3^{m}7).

Muara Salinbatoe (July and Sept., 1926):—

Bar off the entrance to Sungei Poeloe (Palu) Pattah .	15 feet (4^{m}6).
Entrance to Sungei Koebil (Kubil)	11 feet (3^{m}4).
Off Salinbatoe (Salinbatu) village	12 feet (3^{m}7).
North-eastward of Tanjong Teras	8 feet (2^{m}4).
Bar about 1½ miles above Tanjong Teras . . .	8 feet (2^{m}4).
At Tanjong Boejoe	10 (feet 3^{m}0).

Elsewhere, in both entrances, a least depth of 12 feet (3^{m}7) can be reckoned on up to Tandjoeng Selor (*Lat. 2° 50′ N., Long. 117° 22′ E.*); in the dry season a vessel with a draught of 13 feet (4^{m}0) can only proceed up the river at spring tides. At low water spring tides the depths in the mouths of the delta are about 6 feet (1^{m}8) below mean water level, and near Tandjoeng Selor about 2 feet (0^{m}6) below.

Tidal streams.—The tidal streams in the mouths of the delta are almost entirely semi-diurnal, the in-going stream running for about 5½ hours and the out-going stream, 7 hours; the former starts about one hour after the time of low water, and the latter at the time of high water. The in-going stream attains a maximum rate of 1½ knots at spring tides, and the out-going stream a maximum rate of 2½ knots; at neap tides these rates are one knot and 2 knots, respectively. These particulars may be considerably influenced by the conditions in the upper reaches of the river, especially in May and October, when floods are liable to occur.

Off the entrance to Muara Makapan the in-going stream sets in a west-north-westerly direction, and the out-going stream east-south-easterly. In Sungei Temenggah the out-going stream sets northward, and occurs about one hour later than in Muara Makapan; the in-

Charts 2660b, 1263.

Chart 3577.

going stream sets southward and at approximately the same time as in Muara Makapan; the changes of direction in both the out-going and in-going streams correspond with the changes in the vertical movement of the water at Steile hoek, at the southern entrance to Sungei Temenggah.

Tide-gauges.—A tide-gauge, marked in decimetres, is situated on Tanjong Djoengdjoeng (Jungjung), about 2 miles north-eastward of the northern entrance to Sungei Temenggah, and gives the least depth on the alignment of the leading marks at Steile hoek. A tide-gauge, marked in decimetres, also shewing the depth on the alignment of the leading marks, stands about 1½ miles west-south-westward of the southern entrance to Sungei Temenggah. There is a tide-gauge, marked in decimetres, on the Government pier at Tandjoeng Selor; during floods, when the water rises 6 feet (1^m8) above ordinary high water, the reading at low water springs on this tide-gauge is about zero.

Main channel to Tandjoeng Selor.—Muara Makapan.—Beacon.—The entrance to Muara Makapan lies about 17 miles northward of Tanjong Sepikat. From outside the bank extending from the delta the following landmarks are usually visible when off the entrance to the river. Baroe (Baru), an island covered with high trees, situated in the western part of the channel between Pekin and Mening; Baroe is also visible over Mening. Makapan, off the north coast of Mening, has a prominent clump of high trees on its northern side. Pulau Doea (Dua), two islets about 3½ miles northward of Makapan (*Lat. 3° 00′ N., Long. 117° 38′ E.*), covered with high trees. Tarakan and Boenjoe (Bunyu), two hilly islands off the delta of Sesajap rivier.

A white beacon, surmounted by a ball, stands on the southern edge of a bank which partly dries, about 8½ miles north-eastward of Makapan.

As local knowledge is necessary for proceeding up Sungei Temenggah and Boeloengan rivier, none of the marks for these rivers will be described, and no directions will be given.

Tandjoeng Selor.—Tandjoeng Selor, the residence of a Government official, is situated on the right bank of Boeloengan rivier, and is the trading centre for territory adjoining this river; the Sultan of Boeloengan resides at Tandjoeng Pelas, a village on the opposite side of the river. The Government pier has a depth of 11 feet (3^m4) alongside.

Tandjoeng Selor is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

The roadstead is bounded by the parallels of Tanjong Boejoe and of Tandjoeng Selor.

The river above Tandjoeng Selor is only navigable for a short distance by small vessels with a draught of 6 feet (1^m8).

Tidal streams.—The out-going stream at Tandjoeng Selor attains a rate of about 2 knots at springs; the in-going stream is weak.

For tidal stream signals, *see* page 472. The night signals are only exhibited when a vessel is expected.

Submarine cables.—Telephone cables are laid across the river at Tandjoeng Selor; the landing places are marked by notice boards.

Muara Salinbatoe.—Beacon.—Buoy.—Muara Salinbatoe, the northern mouth of Boeloengan rivier, requires local knowledge, or the services of a native pilot, for its navigation. Vessels approaching

Charts 2636, 2660b, 1263.

Chart 3577.

this entrance should make for the outer buoys in the Linkas approach channel and then steer to pass southward of Menoeloen, an islet situated about 9 miles northward of Pulau Doea; the channel then leads towards Sungei Brassan, which flows out on the western side of the entrance to Muara Salinbatoe.

A white beacon, surmounted by a ball, marks the southern edge of the reef extending from Menoeloen. A black can buoy is moored off the entrance to Muara Salinbatoe.

ISLANDS AND DANGERS OFF THE SESAJAP DELTA.—The islands of Tarakan and Boenjoe (Bunyu) with the adjacent reefs and banks, form part of the delta of Sesajap rivier.

Southward of these two islands dangerous banks extend practically to those extending from the Boeloengan delta, whilst eastward of Tarakan a bank extends for 18 miles, with depths of less than 6 fathoms (11^{m}0) over it, being steep-to on its outer edge; northward and westward of the two islands the land is low and monotonously wooded.

Passing vessels should keep in a depth of not less than 30 fathoms (54^{m}9); vessels bound for Tarakan or Boenjoe should sight the light-buoy in the Linkas approach channel, or the black and white spherical buoy about 17 miles east-north-eastward of Tanjong Batoe (*Lat. 3° 15′ N., Long. 117° 39′ E.*), before steering in for either of these islands.

Chart 2636.

A bank, with a depth of 8 fathoms (14^{m}6) over it, was reported, in 1931, to lie about 37 miles eastward of Tanjong Batoe.

A shoal, with a depth of 3¼ fathoms (5^{m}9) over it, lies about 21 miles eastward of Tanjong Arang, the southern extremity of Boenjoe.

Chart 3577.

Tarakan.—Tarakan is hilly, attaining an elevation of 462 feet (140^{m}8) near its southern extremity and 512 feet (156^{m}1) at Tanjong Djoeata (Juata), the north-western extremity; except for one or two small villages on the coast, and the oil settlement at Linkas on the south-west coast, the island is densely wooded and uninhabited.

Menoeloen (Menulun), about 1¾ miles south-south-westward of Tanjong Batoe, is a small islet, with high trees, lying on an extensive reef, which dries, and is steep-to at its western end. A channel about 2½ cables wide, cuts through the drying reef about 7½ cables north-westward of Menoeloen. Kaletiak, a wooded islet, lies about 3 miles southward of Menoeloen, on the extensive banks in the approach to Muara Salinbatoe.

Reede Linkas and approaches.—Piers.—There are two oiling piers and a Naval pier north-westward of them, situated on the south-western side of Tarakan. Reede Linkas is bounded by the arc of a circle drawn with a radius of 1½ miles from the head of the northern oiling pier. Large vessels can lie alongside the **T**-heads of the oiling piers, where oil can be delivered at the rate of 600 tons per hour. The southern oiling pier has a **T**-head, 515 feet (157^{m}0) long, with a least depth of 21 feet (6^{m}4) alongside; the northern oiling pier has a **T**-head, 50 feet (15^{m}2) long, with a least depth of 37 feet (11^{m}3) alongside. Vessels can lie alongside these piers in safety throughout the year; from July to December, when strong westerly winds or squalls may be expected, it is advisable to let go the port anchor. There is

Charts 2576, 2660b, 1263.

Chart 3577.

a dolphin on each side of the northern pier-head. Vessels with a maximum draught of 23 feet (7^{m}0) can berth alongside the Commercial pier.

The usual anchorage is off the two oiling piers, in a depth of about 11 fathoms (20^{m}1). As the tidal stream in the roadstead may attain a rate of 4 knots, and drifting trees are brought down by the out-going stream, it is advisable to veer the cable to about 50 fathoms (91^{m}4). There are mooring buoys and dolphins off both oiling piers.

The area northward of lat. 3° 17′ 15″ N. should be avoided on account of obstructions.

A look-out tower is situated on the south-western side of Tarakan about midway between the two oiling piers, and there is a conspicuous tree about 4 cables northward of it.

Linkas is the headquarters of a Government official. Provisions can be obtained in moderate quantities. Water for boilers only can be obtained. There are two cranes, one of 2 tons and the other of 5 tons lifting capacity, on the southern oiling pier. A doctor is stationed at Linkas, and there is a hospital about 5 miles from the settlement. Linkas is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

The oil establishment is situated about 2 miles inland, on Sungei Pemoesian, and is connected to Linkas by a good road.

Swept channel.—Lights.—Dangers.—Beacons.—Buoyage.— Leading lights are exhibited on the north-western end of the reef on which Menoeloen lies; the front light is exhibited, at an elevation of 43 feet (13^{m}1), from a white iron beacon, 33 feet (10^{m}1) in height, and the rear light (*Lat. 3° 14′ N., Long. 117° 37′ E.*) is exhibited, at an elevation of 59 feet (18^{m}0), from a similar structure 49 feet (14^{m}9) in height. These two lights are about half a mile apart, and, in line bearing 267°, lead in the channel from the light-buoy to a position about one mile from the front light-beacon.

A channel, one mile wide, on the leading line available for all vessels, has been swept from a position about 13 miles to about one mile from the front light-beacon, thence half a mile wide in a 293° direction for a distance of about 2¼ miles, thence half a mile wide, in a 348° direction for a distance of about 1½ miles to the anchorage in Reede Linkas.

A conical light-buoy, painted white, exhibiting a *white flashing* light *every five seconds,* is moored in the fairway of the channel, about 13½ miles eastward of Tanjong Batoe.

A black can buoy is moored on the southern side of the channel about 8 miles eastward of the front leading light-beacon.

A white beacon, surmounted by a ball, stands on the edge of the reef extending southward from Tanjong Batoe; another beacon stands on the bank about half a mile north-eastward of that point.

A light is exhibited, at an elevation of 36 feet (11^{m}0), from a white iron beacon, 26 feet (7^{m}9) in height, on the edge of the reef extending from Tanjong Mengatjoe, a point about 1½ miles westward of Tanjong Batoe.

A beacon stands on the north-eastern side of Menoeloen.

A 4-fathom (7^{m}3) patch lies about 1¾ miles westward of the rear leading light-beacon.

A conical light-buoy, painted black, exhibiting a *red fixed* light, is moored on the eastern side of a 3¼-fathom (5^{m}9) patch, about 7½ cables

Charts 2636, 2576, 2660b, 1263.

Chart 3577.

southward of the look-out tower. A light-buoy, painted black, occasionally exhibiting a *green fixed* light, is moored about 4 cables north-westward of a 3¼-fathom ($5^{m}9$) shoal, situated about 5 cables southward of the look-out tower. A white conical buoy is moored about 6 cables westward of the look-out tower.

Pilotage.—Pilotage is compulsory for merchant vessels. Pilots, for whom a request should be made by radio 24 hours before the expected time of arrival at the outer light-buoy, are under the direction of the Harbour master at Linkas. When vessels are approaching simultaneously preference is usually given to the vessel of the greatest tonnage. For Pilot signals, *see* page 11.

Boenjoe and adjacent dangers.—Buoys.—Boenjoe is hilly, attaining its greatest elevation of 502 feet ($153^{m}0$), on its north-western side, but there are no noticeable summits. Except in the vicinity of the former shipping place for oil on the south-western side, the island is densely wooded and uninhabited. Owing to the numerous dangers in the vicinity, the island is difficult to approach except through the channel along the south-western side. Sungei Oedang (Udang) discharges about 1¼ miles north-westward of Tanjong Arang (page 476), and a flagstaff stands about half a mile farther north-westward. There is a small pier about 1½ cables within the mouth of Sungei Oedang; the mouth of the river, and the pier, dry at low water. About five cables north-westward of Sungei Oedang there is a pier about 2½ cables long, with a **T**-head, about 135 feet ($41^{m}1$) long, with a depth of about 18 feet ($5^{m}5$) alongside.

A bank, with depths of less than 3 fathoms ($5^{m}5$) over it, extends about one mile southward from Tanjong Arang, and is marked at its outer edge by a white barrel buoy.

Kruys reef, with a depth of 2¼ fathoms ($4^{m}1$) over it, and steep-to, lies about 4 miles east-south-eastward of Tanjong Arang (*Lat. 3° 27′ N., Long. 117° 52′ E.*), and is not marked by discoloration. A 4¾-fathom ($8^{m}7$) patch lies 2½ miles east-south-eastward of the same point.

Johanna reef, with a least depth of 3 feet ($0^{m}9$) over it, and steep-to, lies with its eastern extremity about 6 miles south-eastward of Tanjong Arang, and is not marked by discoloration. Adat reef, with a depth of 2¾ fathoms ($5^{m}0$) over it, and not marked by discoloration, lies about 6½ miles southward of Tanjong Arang. A 4¼-fathom ($7^{m}8$) patch lies about 3 miles southward of the same point.

Anchorage.—Directions.—Anchorage can be obtained, in a depth of about 8 fathoms ($14^{m}6$), about one mile southward of the flagstaff on the south-west coast of Boenjoe; the tidal streams may attain a rate of 4 knots in the anchorage. A good berth is in a depth of 5½ fathoms ($10^{m}1$), with the largest house bearing 046°, and the southern extremity of Boenjoe, 103°.

Vessels approaching from north-eastward or eastward should avoid the shoal (chart 2636), with a depth of 3¼ fathoms ($5^{m}9$) over it, about 21 miles eastward of Tanjong Arang.

The approach channel leading to the anchorage off the south-western coast of Boenjoe is entered between Kruys reef and Johanna reef; when well outside the banks vessels should make sure of identifying Tanjong Arang, which is moderately steep, and then steer for it. There are otherwise no landmarks, the banks are not marked by discoloration and are too steep-to for sounding to give any warning, whilst the tidal

Charts 2636, 2576, 2660b, 1263.

Chart 3577.

streams set across. Strangers should not attempt to pass northward of Kruys reef.

From the entrance the channel runs in a westerly direction, passing southward of the white buoy southward of Tanjong Arang and thence for the roadstead; the least depth in the fairway is 6 fathoms ($11^{m}0$). Vessels usually anchor during the out-going stream.

The channel north-westward of the above anchorage becomes narrower and shoaler, the drying banks are not marked by discoloration when covered, and the tidal streams are strong; as it is not buoyed, navigation is difficult.

SESAJAP RIVIER.—The delta of Sesajap (Sesayap) rivier within the islands Tarakan and Boenjoe, is formed by a number of low, thickly wooded islands, separated and intersected by numerous channels, only the principal of which are shown on the chart. Sesajap rivier divides into three main mouths at the beginning of the delta, namely: Zuid Sesajapmond (South Sesayap), Midden Sesajapmond (Middle Sesayap), and Noord Sesajapmond (North Sesayap). The portion of Midden Sesajapmond between Bangkoedoelis (Bangkudulis) and Bangkoedoelis (Bangkudulis) kechil was reported, in 1934, to have shoaled considerably; no reliance, therefore, can be placed on the depths shown on the chart in this part of the channel. Various channels lead from seaward to these mouths. The principal one being from Reede Linkas (page 476), passing along the western side of Tarakan, through Straat Batagau, which separates the islands Pajau (Payau) (*Lat. 3° 23′ N., Long. 117° 29′ E.*) and Tarakan, thence through the strait separating the islands Bangkoedoelis and Tibi, and thence through Midden Sesajapmond into Sesajap rivier.

Tidal streams.—Eastward of the meridian of 118° E. there is a constant south-going current more or less influenced by the prevailing winds. Westward of this meridian the streams are semi-diurnal, and mainly follow the direction of the channels, and may attain a rate of over 4 knots, especially the out-going stream, both southward and northward of Menoeloen.

Directions.—Three serviceable channels lead from Reede Linkas to Zuid Sesajapmond: (*a*) through Straat Batagau; (*b*) through Muara Liangau, which runs along the southern side of Pajau, and thence through Apas Pajau (Payau), which runs along the western side of Pajau; (*c*) through Muara Liangau, thence through Sungei Liangau, and thence through Sungei Nateh or Trusan Sesajap. The last mentioned channel is only suitable for small vessels with a draught of not more than 6 feet ($1^{m}8$).

Two serviceable channels lead from seaward to Midden Sesajapmond: (*a*) through the approach channel to Reede Linkas, passing southward of Tanjong Batoe, and thence through Straat Batagau; (*b*) through the channel southward of Boenjoe, thence through the channel between the northern side of Tarakan and the southern side of Tibi, and thence through the strait between Tibi and Bangkoedoelis.

For route (*a*), *see* the remarks on the channel to Reede Linkas (page 476); for the remainder of this route the chart is a sufficient guide.

For route (*b*) a vessel should follow the directions given for Boenjoe anchorage on page 478 until the eastern side of Boenjoe bears 000°,

Charts 2636, 2576, 2660b, 1263.

Chart 3577.

when she should steer for the opening between Tarakan and Tibi, passing southward of the shoal, with a least depth of 2 fathoms (3^{m}7) over it, lying about 4½ miles north-eastward of Tanjong Simaja (Si Maya), the north-eastern extremity of Tarakan. For the remainder of this route the chart is a sufficient guide; Djoeata a hill, on Tanjong Djoeata (page 476), is a useful landmark.

There are two serviceable channels from seaward to Noord Sesajapmond: (*a*) southward of Boenjoe and thence through Muara Sabawang, which leads along the northern side of Tibi; (*b*) northward of Boenjoe through Muara Serban, and thence through the channel between the islands of Baroe (Baru) and Tembagan.

Approaching either of these channels from eastward, the vessel should avoid the shoal, with a depth of 3¼ fathoms (5^{m}9) over it, about 21 miles eastward of Tanjong Arang.

For route (*a*) the vessel should follow the directions given for route (*b*) of Midden Sesajapmond until past the 2-fathom (3^{m}7) shoal lying north-eastward of Tanjong Simaja, when a north-westerly course may be steered into Muara Sabawang; care should be taken, however, to avoid the shoal spit extending 3¾ miles east-south-eastward from Tanjong Tibi, the eastern extremity of Pulau Tibi.

Route (*b*) presents no difficulty in clear weather. The entrance to Muara Serban lies between the islands of Boenjoe and Mandoel (Mandul); a conspicuous clump of trees on an island close northward of Hoek Keerweer, the eastern extremity of Mandoel, can be seen in clear weather when about 10 miles eastward of this entrance; a little later Tanjong Ahoes (Ahus), 5 miles northward of Hoek Keerweer (*Lat. 3° 43′ N., Long. 117° 50′ E.*), will be identified by the high trees on it. When well outside the delta bank the vessel should steer for Tanjong Oetara (Utara), the northern extremity of Boenjoe, bearing 270°, and, when the south-eastern extremity of Boenjoe bears 232° she should steer 278°, sounding continuously, for the entrance to Muara Serban. There is a village close within the eastern extremity of Baroe. At the entrance to the channel between Baroe and Tembagan there is a bar, with a depth of 2¾ fathoms (5^{m}0) over it.

Chart 3577, plan of continuation of Sungei Sesayap.

Sesajap rivier above the delta.—Sesajap rivier is formed by numerous streams rising in the central mountain range of Borneo; westward of the meridian 116° 40′ E. the river is known as Sungei Malinau, and higher up, far inland, as Sungei Toeboe. The banks of the river are sparsely populated; the products of the district are usually taken to Tandjoeng Selor (page 475). There is a least depth of 5 feet (1^{m}5) in the fairway as far as Malinau village, about 60 miles above the delta, but above that the river is only navigable by boats.

Chart 3577.

COAST.—Sembakoeng rivier.—Tanjong Ahoes and the adjacent land are monotonously wooded, although the trees on this point are higher than those around. Except for the Sembakoeng (Sembakung) hills (chart 2636), on Mandoel, which are generally visible about 24 miles, the land is low.

Sembakoeng (Sembakung) rivier, which is navigable by vessels with local knowledge, flows out between Hoek Keerweer and Tanjong Ahoes, after running along the northern side of Mandoel; the better

Chart 3577.

entrance to it, however, is along the western side of Mandoel through Muara Ledoeng (Ledung) and Trusan Gelagan, which can be entered from the Sesajap delta. The depths in the river as far as Tagol village, about 45 miles above Tanjong Bimau, the western extremity of 5
Mandoel, vary between 8 and 10 feet (2^m4 and 3^m0).

Charts 2636, 2576, 2660b, 1263.

CHAPTER XV

SOUTH COAST OF CELEBES—STRAATEN SALEIER, TIORO, AND BOETON—TOEKANG BESI EILANDEN

Charts 2637, 3616.

SOUTH COAST OF CELEBES.—The south coast of Celebes between Ujong Kajoeleleng, the eastern entrance point of Malasoro baai (page 420), and Tanjong Lassa, about 50 miles eastward, is generally steep, and the depths within the 10-fathom ($18^{m}3$) line are very irregular; the bottom close inshore is moderately hard, generally affording bad holding ground, and rocky patches are found in the midst of hard sand. Numerous fishing praus, which seldom show suitable lights, are met with along this coast, and the good fishing grounds are marked by stakes.

Lompo Batang, or Piek van Bonthain, and the mountains in the south-western part of Celebes, have been described on page 420. Farther eastward the only mountain of note is Slangenberg, 1,388 feet ($423^{m}0$) high (*Lat. 5° 29′ S., Long. 120° 10′ E.*), a thickly wooded cone, rising steeply from the surrounding flat land about 16 miles south-eastward of Lompo Batang.

Climate and weather.—*See* page 17.

Current.—Along the south coast of Celebes between Ujong Kajoeleleng and Straat Saleier a weak, west-going current flows from June to October, and an east-going current from December to March. April, May and November are transition months, when the currents often take a more southerly direction.

Chart 3128, plan of Laikang and Malasoro bays.

Coast.—Djeneponto (Jeneponto) village is situated at the mouth of a river about 4¾ miles eastward of Ujong Kajoeleleng, and is of some importance as it lies on the great post road connecting Makasser with Sindjai (Sinjai) in Golf van Boni; a Government official is stationed at Djeneponto.

The roadstead is bounded by the arc of a circle, described with a radius of one mile, from the middle of the mouth of Djeneponto rivier.

Temporary anchorage, depending on the weather, can be obtained outside the 3-fathom ($5^{m}5$) line off Djeneponto. The village is not easily seen from seaward, but in clear weather Maja (page 420), about 16 miles northward, can be steered for, bearing 356°. At half-tide boats can enter the river by two channels marked by unofficial beacons.

Chart 3616.

Coast.—Between Djeneponto and Boeloekoemba, 29 miles east-

Charts 941b, 1263, 2759a.

Chart 3616.

north-eastward, the coast is covered at intervals with coconut trees, and farther eastward with forest. Tanjong Boeloe Boeloe (Bulu Bulu), about 3½ miles eastward of Djeneponto, is an inconspicuous, rounded point; Tanjong Petang, 5 miles north-eastward of Tanjong Boeloe Boeloe, is low. Between Tanjong Petang and Tanjong Karoem Batoe (Karum Batu), 14½ miles east-north-eastward, the coast forms a bight, and there are several shoal patches, with very irregular depths, within a distance of 2½ miles of the western shore.

Chart 2674, plan of Bonthain road.

Reede Bonthain.—Bonthain village, about 9 miles north-eastward of Tanjong Petang, extends for a considerable distance along the coast at the foot of the mountains. A Government official is stationed here; the trade is almost entirely carried out by Chinese, but the place is not prosperous. There is a waterfall, about 260 feet ($79^{m}2$) high, in the vicinity.

There is anchorage off the village, in depths of from 4 to 6 fathoms ($7^{m}3$ to $11^{m}0$), with good holding ground. The roadstead, which is bounded by the arc of a circle, described with a radius of one mile, from the Government official's flagstaff, is safe in the west monsoon, but the swell is felt until close inshore; in the east monsoon there is often a heavy swell, and with southerly winds boats have considerable difficulty in proceeding alongside the boat pier. Sungei Tanga Tanga, close north-westward of the pier, serves as a harbour for praus, and can be entered by boats at high water.

Bonthain (*Lat. 5° 33′ S., Long. 119° 57′ E.*) is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. There is a harbour doctor.

Chart 3470, plan of Bulukumba and Bintarore roads.

Reede Boeloekoemba.—Light.—Boeloekoemba (Bulukumba) village, the headquarters of a Government official, is situated at the mouth of Sungei Teko, which flows out about 14 miles eastward of Bonthain.

A light is exhibited, at an elevation of 46 feet ($14^{m}0$), from a white iron framework structure, 42 feet ($12^{m}8$) in height, on Tanjong Papanambeja, close southward of the mouth of Sungei Teko.

The roadstead is bounded by the arc of a circle drawn with a radius of about 13¾ cables, from the light-structure on Tanjong Papanambeja.

Cargo vessels usually anchor eastward of the mouth of the river, although they do not lie well here, and communication with the shore is often difficult, as a heavy surf quickly rises off the mouth of the river. Other vessels usually anchor off Binta Roro (Bintarore) village, about one mile westward of Boeloekoemba, where communication with the shore is much easier; care should be taken to avoid a stony patch, with a least depth of 2½ fathoms ($4^{m}6$) over it, lying about one mile south-south-westward of the lighthouse.

The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Boeloekoemba is connected to Makasser by telephone.

Vessels making for Reede Boeloekoemba from westward should give Tanjong Karoem Batoe and the adjacent coast a wide berth, as the depths are very irregular.

Chart 3616.

Outlying bank and dangers.—A bank, with a depth of 24 fathoms

Chart 3616.

($43^{m}9$) over it, was reported, in 1947, to lie about 12½ miles southward of Tanjong Petang.

Taka Boloh, about 14 miles southward of Tanjong Papanambeja, is of sand and coral, with a least depth of 3¾ fathoms ($6^{m}9$) over it; the 100-fathom ($182^{m}9$) line runs close along its eastern side.

Quirk reef, with brown discoloured water, breakers, and tide-rips, over it, was reported, in 1943, to lie about 5½ miles west-north-westward of Taka Boloh.

Taka Rangkap, about 8½ miles south-eastward of Tanjong Papanambeja, is formed of coral, sand, and stones, and has a depth of 2½ fathoms ($4^{m}6$) over it.

There is sometimes a strong current around Taka Boloh and Taka Rangkap, so care should be taken to carefully fix the vessel's position, especially at night.

Slangenberg in line with Boeloekoemba light-structure, bearing 339°, leads between Taka Boloh and Taka Rangkap.

Coast.—The coast eastward of Boeloekoemba is generally low, and the depths are very irregular. Birang Kèkè baai, entered about 5½ miles east-north-eastward of Boeloekoemba, affords good anchorage, in a depth of about 14 fathoms ($25^{m}6$), sheltered in both monsoons. This anchorage is better than that on the lee side of Lioekang Loë (page 485), where there is only anchorage during the east monsoon in case of necessity; there is no other anchorage farther eastward.

Tanjong Lassa (Laso) or Bira (*Lat. 5° 37′ S., Long. 120° 29′ E.*), 17½ miles eastward of Boeloekoemba, is a steep, sharply-defined point, rising to a prominent flat hill, 394 feet ($120^{m}1$) high, named Djangko; some detached rocks, above water, lie close off the point. The coastal reef extends about 2 cables offshore, and a submerged ridge extends about 2½ miles southward, with a small 5-fathom ($9^{m}1$) patch on it, lying about three-quarters of a mile southward of the point.

STRAAT SALEIER. — Light. — Anchorages. — Straat Saleier (Salayar) is about 9 miles wide between Tanjong Lassa and the island of Saleier (Salayar); it is the usual route taken by vessels proceeding from Macassar strait to the east coast of Celebes, and by those proceeding from the Java sea to the Moluccas; the deep, middle part of the strait, between the islands Sarontang and Pasi Tanete, is generally used. *See* views facing this page.

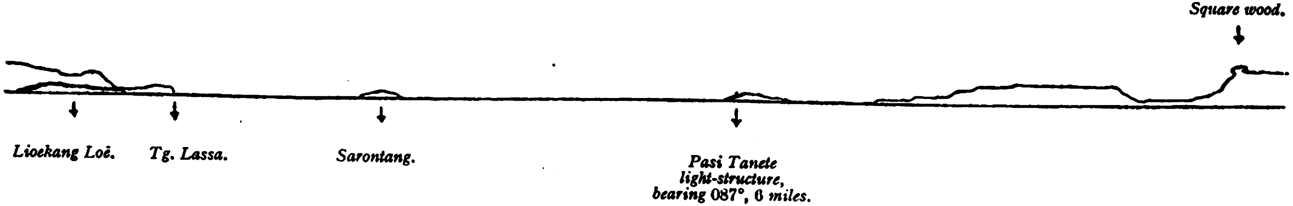
The northern end of Saleier, which terminates in Tanjong Matainji (Matainyi), rises to a very prominent plateau, 384 feet ($117^{m}0$) high, separated from the higher land southward by a deep saddle; this plateau has been frequently mistaken for Pasi Tanete, as it appears as an island from a distance. About 6½ miles southward of Tanjong Matainji there is a very noticeable square wood, standing on the northern end of a ridge at an elevation of 1,118 feet ($340^{m}8$).

The passage between Tanjong Matainji and Pasi Tanete is reduced by reefs extending from both sides to a width of less than half a mile, and, although there is deep water in it, violent and irregular tidal streams render it unfit for any but small vessels.

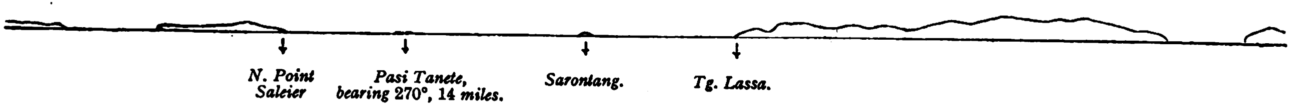
Vessels proceeding westward from Straat Saleier to Macassar strait at night should keep a good look-out, and ascertain their position as soon as possible after passing Djeneponto (page 482); during the east monsoon especially, it is quite possible for vessels to be set outside the

Charts 941b, 942a, 1263, 2759a.

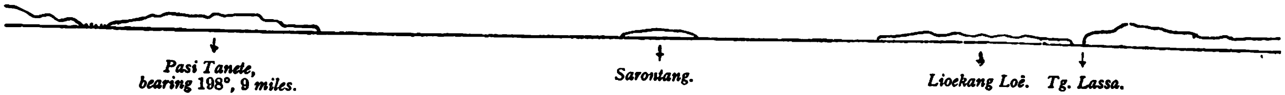
To face page 484.



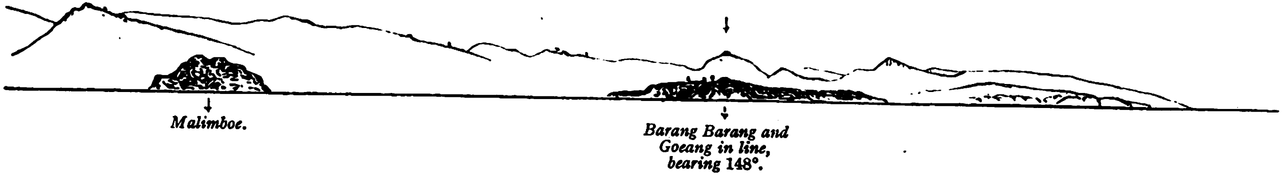
Straat Saleier from westward.
(*Original dated* 1931.)



Straat Saleier from eastward.
(*Original dated* 1931.)



Straat Saleier from north-eastward.
(*Original dated* 1931.)



Saleier, west coast. Clearing mark for Bylandt reef.
(*Original dated* 1931.)

Chart 3616.

arc of visibility of Dajang Dajangan light (page 422), whilst at the same time they might still be expecting to sight it.

Currents.—Weather.—Through all the passages in Straat Saleier strong currents, causing whirlpools, are frequently experienced, and, when wind and current are opposed to each other, overfalls resembling surf are raised; there is often a strong eddy under the Celebes shore. From June to October, at the height of the east monsoon, there is a constant south-west-going stream with a rate of fully one knot; at the decline of this monsoon it takes an easterly direction, which persists till March or April, and the rate decreases to half a knot.

A striking contrast in the weather conditions on either side of Straat Saleier has been frequently observed. During the west monsoon rainy weather may occur on the western side of the strait, whilst on the eastern side it is fine; in May, June, and July rainy weather and a high sea on the eastern side will suddenly change over to calm weather on the western side.

Lioekang (Liukang) Loë or Noord eiland, about 2 miles south-westward of Tanjong Lassa (*Lat. 5° 37′ S., Long. 120° 29′ E.*), is fringed by a reef, and is inhabited on the northern and eastern sides, where it is wooded with coconut trees.

Anchorage can be obtained off the south-west coast of the island, in depths of from 8 to 14 fathoms (14^{m}6 to 25^{m}6), sand; vessels can anchor, in a depth of 11 fathoms (20^{m}1), with the north-western side of Djangko in line with the north-western extremity of Lioekang Loë, bearing about 042°, and Pulau Sarontang in line with the south-western extremity of Lioekang Loë, bearing about 109°. This anchorage is somewhat sheltered from wind and sea during the east monsoon, but there is always a swell and a west-north-west-going current with a rate of from 2 to 3 knots.

Sarontang or Midden eiland, about 3¼ miles southward of Tanjong Lassa, is 137 feet (41^{m}8) high, rocky, sparsely covered with vegetation, and uninhabited; it is fringed by a reef, which extends farthest from its southern side.

Pasi Tanete (Tanette) or Zuid eiland, about three-quarters of a mile northward of Tanjong Matainji, is 194 feet (59^{m}1) high, and, except on the northern side, which can be closely approached, is fringed by a reef. There are a couple of houses and some coconut trees on the low south-coast of the island, where the ground is somewhat less rocky.

A light is exhibited, at an elevation of 145 feet (44^{m}2), from a white iron framework structure, 67 feet (20^{m}4) in height, on the northern side of Pasi Tanete.

SALEIER.—Saleier is an island traversed throughout its length by a chain of mountains in terrace formation, descending steeply to the sea on the eastern side, and sloping gradually to the flat stretch of coast on the western side. The appearance of the northern extremity of the island is described with Straat Saleier on page 484; other noticeable mountains are: Saleier (Salayar), the highest, with an elevation of 2,156 feet (657^{m}2), close to the east coast and about 16 miles southward of Tanjong Matainji; Rokoboko, about 10 miles southward of Saleier and 1,473 feet (449^{m}0) high; Lajolo, 6 miles southward of Rokoboko and 2,156 feet (657^{m}2) high. Barang Barang, about 5 miles from the southern extremity of the island, has a promin-

Charts 941b, 942a, 1263, 2759a.

Chart 3616.

ent square summit, 853 feet (260^{m}0) high, and on Tanjong Tepo, about 2 miles farther south-south-eastward, is a hill with a sharp summit, 807 feet (246^{m}0) high, noticeable when seen from southward.

The inhabitants, consisting of a mixed branch of the Makasser race, dwell almost entirely on the west coast of the island, and live mainly by fishing, coconut cultivation, and collecting salt, turtle, and tripang. The east coast is almost uninhabited, the only villages being Pinang, close northward of Tanjong Tepo, and Oedjoeng and Tanette, about 7½ and 4 miles, respectively, from the northern extremity of the island; there are larger villages farther inland, and the slopes of the mountains are planted with maize and coconut trees. The island experiences a considerable amount of strong winds in both monsoons, and it is not uncommon for coconut trees to be blown down.

Western side of Saleier.—Coast.—Dangers.—The west coast of Saleier southward of Balangnipa (*Lat. 5° 55′ S., Long. 120° 27′ E.*), a well-populated village situated about 9½ miles southward of the northern extremity of the island, becomes higher, but there are no conspicuous summits; during the east monsoon numerous praus are usually seen lying near the coastal reef off Balangnipa village, and there is considerable native traffic between here and Celebes and also to the southward. About 5 miles southward of Balangnipa there is a noticeable cleft in the hilly land, and a conspicuous tree stands about one mile north-eastward of this cleft.

Southward of the above cleft the 100-fathom (182^{m}9) line trends in a westerly direction to a distance of about 10 miles from the coast, and thence southward for a distance of about 15 miles before approaching the coast again, thus enclosing an extensive bank, with general depths of less than 30 fathoms (54^{m}9) over it, and steep-to on its outer edge. Whale reefs, in the north-western corner of this bank, consist of four detached shoals, with depths of from 2 to 4¼ fathoms (3^{m}7 to 7^{m}8) over them, sometimes visible by discoloration from a distance of about 2 miles; the outer patch, with a depth of 4¼ fathoms (7^{m}8) over it, lies about 9 miles from the coast and half a mile within the 100-fathom (182^{m}9) line.

Chart 2674, plan of channel between Salayar and Pasi or Varkens island.

Pasi.—Pasi or Varkens eiland lies on the bank described above and parallel with the west coast of Saleier. The northern end, terminating in Tanjong Baroeja (Baruya), is low and thickly covered with coconut trees; about 1½ miles south-south-westward of Tanjong Baroeja is the northern end of a hilly ridge, attaining a maximum elevation of 187 feet (57^{m}0). The highest part of the island, which has an elevation of 315 feet (96^{m}0), is near the south-eastern extremity, but this hill is not very prominent.

The coastal reef around Pasi is narrow on the eastern side, but extends about 1¼ miles north-westward from Tanjong Baroeja, and is from about 1½ to 6 cables wide on the western and southern sides of the island.

Channel between Pasi and Saleier.—Dangers.—Beacon.—This channel is about 1½ miles wide at its northern end, between Tanjong Baroeja and the west coast of Saleier, but at the southern end it contracts to about one cable. The land on the eastern side of the channel is moderately high, and close south-eastward of Apabatoe (Apabatu) village, situated on the eastern side of the northern entrance

Charts 941b, 942a, 1263, 2759a.

Chart 2674, plan of channel between Salayar and Pasi or Varkens island.

and about 2¼ miles north-eastward of Tanjong Baroeja, there is a noticeable gap in the hills, known as Noord kloof (North Gap); about 2½ miles farther southward there is a similar gap, known as Zuid kloof.

A 2¾-fathom ($5^{m}0$) patch lies in mid-channel about 1¼ miles northward of Tanjong Baroeja, and a 2½-fathom ($4^{m}6$) patch lies about 3 cables north-eastward of the same point and about one cable from the edge of the fringing reef.

A reef, with a depth of 5 feet ($1^{m}5$) over it, lies about 6 cables eastward of Tanjong Baroeja, and is marked by a black beacon, surmounted by a cone. Close southward of this reef is another reef, with a depth of 1½ fathoms ($2^{m}7$) over it. Eastward of these two reefs are two more reefs, with depths of 1¾ and 2 fathoms ($3^{m}2$ and $3^{m}7$) over them, respectively. A 1¼-fathom ($2^{m}3$) patch lies about one mile south-eastward of Tanjong Baroeja (*Lat. 6° 06′ S., Long. 120° 27′ E.*).

Two reefs, which dry, lie in mid-channel about one and 1½ miles, respectively, southward of Tanjong Baroeja; there are several dangers between the northern reef and the coast eastward, the positions of which can best be seen on the chart.

Reede Benteng.—Light.—Benteng, about 1¾ miles south-south-westward of Apabatoe village, is the headquarters of a Government official. There is a flagstaff at the northern end of the village, and a boat pier, which can only be reached at high water. An obstruction was reported, in 1947, to exist close off the landing steps.

A light is exhibited, at an elevation of 63 feet ($19^{m}2$), from the flagstaff.

A bank, with a depth of 5 feet ($1^{m}5$) at its outer edge, extends about 3 cables offshore close northward of the pier, and there is a depth of 3 feet ($0^{m}9$) about 2 cables westward of the pier.

The roadstead is bounded by a line drawn from Tanjong Baroeja to the flagstaff at Benteng, thence in a 259° direction to Pasi.

The usual anchorage is about half a mile off the village, in depths of from 6½ to 8 fathoms ($11^{m}9$ to $14^{m}6$); strong westerly winds quickly raise a sea, and communication with the shore is then difficult. In such a case it is better to anchor under the Pasi shore opposite Padang village, in the southern part of the channel.

Reede Benteng is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Provisions are obtainable in moderate quantities.

Tidal streams.—Northward of Pasi the tidal streams set northward and southward, and the usual rate does not exceed from one to 1½ knots; on the western side of Pasi the tidal streams run in the same direction, and a maximum rate of 1½ knots has been observed. Southward of Pasi, and between the southern extremity of Saleier and Bahoeloewang, a north-west-going stream, sometimes attaining a rate of about 3 knots, occurs; during May, June, and July the south-east-going stream is not so strong. The tidal streams in the channel between Pasi and Saleier are very weak.

Directions.—A vessel bound for Reede Benteng from northward should take care to avoid the 2¾-fathom ($5^{m}0$) patch lying about 1¼ miles northward of Tanjong Baroeja and also the 2½-fathom ($4^{m}6$) patch about 3 cables north-eastward of the same point.

An isolated zinc shed stands about 4 cables southward of the flagstaff at Benteng, and, in line with the black beacon on the reef eastward

Charts 3616, 941b, 942a, 1263, 2759a.

Chart 2674, plan of channel between Salayar and Pasi or Varkens island.

of Tanjong Baroeja, bearing 139°, affords a good mark for approaching Reede Benteng. When approaching on this mark the vessel should steer 150° when Tanjong Baroeja bears 250°, and continue on this course until the flagstaff bears about 109°, passing westward of the beacon and the 1½-fathom ($2^{m}7$) reef southward of it, thence she should steer for the middle of the village, and anchor in a depth of 6½ fathoms ($11^{m}9$) when the flagstaff bears 090°.

Southern part of the channel.—Beacons.—The southern part of the channel between Pasi and Saleier, known as Padang narrows, is greatly obstructed by fishing stakes, as a large fishing industry is carried out from the adjacent villages on the shoals within the 3-fathom ($5^{m}5$) line. The western side of this channel is marked by two black beacons, each surmounted by a cone, the northern one also having a black and white chequered daymark.

Padang village (*Lat. 6° 11′ S., Long. 120° 27′ E.*) is situated on the eastern side of the narrows, and is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Directions.—A vessel proceeding through Padang narrows from northward should proceed along the Pasi side of the channel, passing westward of all the reefs in the northern part, off Benteng. A vessel proceeding southward from Reede Benteng should at once cross over to the Pasi shore, passing southward of the 1½-fathom ($2^{m}7$) reef about three-quarters of a mile east-south-eastward of Tanjong Baroeja.

When nearing the narrows she should not approach the Pasi shore too closely, as a shoal, with a depth of about one foot ($0^{m}3$) over it, lies about 1½ cables offshore and 7 cables northward of Dopa, a village on the western side of the entrance to the narrows. She should pass eastward of the beacon with a black and white chequered daymark close off the Pasi shore and about half a mile south-westward of Padang village, and thence into the narrowest part of the channel; when abreast Tanjong Batoe (Batu) Dongkalang, the south-eastern extremity of Pasi, the Pasi shore should be given a wider berth, so as to pass eastward of the black beacon off that point. When past this beacon she should alter course southward and pass eastward of the reef, with a depth of about one foot ($0^{m}3$) over it, lying about 8 cables southward of Tanjong Batoe Dongkalang.

Chart 3616.

Off-lying reef.—Bylandt reef, with a least depth of 5 feet ($1^{m}5$) over it, lies about 5 miles southward of Pasi and is plainly marked by discoloration; a 2¾-fathom ($5^{m}0$) patch lying about 1¼ miles west-north-westward of this reef is only slightly marked by discoloration. Barang Barang (page 485) in line with the summit of Goeang (Guwang) (page 489), bearing 148°, leads north-eastward of Bylandt reef; *see* view facing page 484.

Coast.—Islets and dangers.—Southward of the channel between Pasi and Saleier the coast is high as far as Lajolo (Layolo) baai, a distance of about 4½ miles, and thence it gradually decreases in elevation to Tanjong Apatana, the southern extremity of Saleier. Lajolo baai is only suitable for small vessels; Tanjong Batoe Poetih, on the southern side of the bay, is high and consists of white sandstone; from this point a reef extends about 2 miles westward. Tanjong Batoe (Batu) Kerapo, 5 miles southward of Tanjong Batoe Poetih, is steep and rocky.

Charts 941b, 942a, 1263, 2759a.

Chart 3616.

Malimboe (Malimbu) and Goeang are two islets lying on a reef which dries near the coast between Tanjong Batoe Poetih and Tanjong Batoe Kerapo. Malimboe, 217 feet ($66^{m}1$) high, has a sharp summit, and Goeang is 187 feet ($57^{m}0$) high and flatter. *See* view facing page 484.

In the east monsoon anchorage may be obtained off the coast between Tanjong Batoe (Batu) Kallong, the northern entrance point of Lajolo baai, and Tiele Tiele village, about 2 miles northward, but care should be taken to avoid some off-lying reefs which are not marked by discoloration ; the northernmost of these, with a depth of 3¾ fathoms ($6^{m}9$) over it, lies nearly 1½ miles westward of Tiele Tiele village, and the southernmost, with a depth of 4¼ fathoms ($7^{m}8$) over it, lies about one mile south-westward of Tanjong Batoe Kallong (*Lat. 6° 16′ S., Long. 120° 27′ E.*). Two noticeable rocks above water lie on the coastal reef off Tiele Tiele village.

There is also good anchorage for vessels with local knowledge, about 2¾ cables westward of the southern extremity of Goeang, in depths of from 15 to 20 fathoms ($27^{m}4$ to $36^{m}6$), sand. The channel within Goeang and Malimboe is only suitable for praus. Pondang village, in the bay eastward of Tanjong Batoe Kerapo, is visible from northward.

Tanjong Apatana is a low point terminating in a sandbank, and is fringed by a reef which extends as much as three-quarters of a mile offshore, and is steep-to.

Eastern side of Saleier.—The east coast of Saleier is generally rocky, with sandy beaches in the small bays. The coastal reef is very narrow, except near Tanjong Apatana ; in the east monsoon this coast is practically inaccessible.

There are practically no anchorages along this coast, even in the west monsoon, as the bottom is too steep for the anchor to hold. Small vessels with local knowledge can anchor off the mouth of a stream in Telok Bone Poetih, a small inlet on the western side of Tanjong Harbaka, situated 15½ miles northward of Tanjong Apatana ; this anchorage is possibly fairly sheltered even in the east monsoon. It is advisable to approach with the anchor lowered to about 20 fathoms ($36^{m}6$), as sounding along this coast, except by the anchor, is no guide. A vessel with local knowledge can also anchor, in a depth of about 30 fathoms ($54^{m}9$), off Tanjong Batoe Poetih, about 18 miles northward of Tanjong Harbaka, and off Tanette village, about 7 miles farther northward.

Chart 1696.

Islands off the southern extremity of Saleier.—Bahoeloeang (Bahuluwang), Tambolongang (Tambulongang) and Poelasi (Pulassi) are three prominent islands lying near the eastern edge of an extensive bank lying close south-westward of the southern extremity of Saleier. This bank is steep-to near the 100-fathom ($182^{m}9$) line, and consists of sand, coral, and rocks ; the water is extraordinarily clear, and the bottom can be easily seen at a depth of 10 fathoms ($18^{m}3$). On this bank there are several shoal patches, the positions of which can be seen on the chart.

Bahoeloeang, the northernmost island, lies about 3½ miles west-north-westward of Tanjong Apatana ; a reef, which dries, extends about 1½ miles northward, and a sandbank, which dries, and some rocks above water lie on this reef near the northern extremity of the

Charts 941b, 942a, 1263, 2759a.

Chart 1696.

island. Bahoeloeang village is situated on the east coast, but there is no anchorage off it.

Tamboelongang, 5½ miles southward of Bahoeloeang, with Bontoh Koekoesang (Kukusang), a hill, 725 feet (221^{m}0) high, in the northern part, is a good landmark from all directions; the land on the southern side of this hill descends gradually, and Bontoh Boelaïn (Bulain), a hill near the east coast, is also noticeable. Pala village, where the native chief resides, is situated on the east coast.

Anchorage may be obtained, in a depth of 10 fathoms (18^{m}3), in the east monsoon, westward of the peninsula on the north-western side of Tambolongang.

A narrow ridge, named Badjan (Bajan) Lamberreh, with a least depth of 2 fathoms (3^{m}7) in the central part, extends from Bahoeloeang to Tamboelongang. A stream, with a rate of 2 knots, has been observed over this ridge.

Poelasi, about one mile southward of Tambolongang, has a hill, 745 feet (227^{m}1) high, in the northern part, descending gradually southward with a series of hills. There are several villages on this island.

Nambolaki (Namboh Laki) (*Lat. 6° 41′ S., Long. 120° 17′ E.*) is a small islet about 9 miles westward of Poelasi and on the south-western corner of the extensive bank on which the group lies; it is uninhabited, but the inhabitants of the larger islands seek for turtle on the extensive drying reef around it.

The passages between these islands are unsafe and should be avoided, although with careful sounding, little sea, and a clear sight of the reefs, small vessels may pass over Badjan Lamberreh, taking care to avoid the shoal central part. The passage between Bahoeloeang and Saleier is deep and safe.

Charts 1696, 3616.

ISLANDS AND REEFS SOUTH-EASTWARD OF SALEIER.—South-eastward of Saleier are several groups of islands, all lying on separate plateaus rising from great depths. In the west monsoon the atmosphere is remarkably clear, and from the neighbourhood of Tana Djampea, lying 31 miles south-south-eastward of Saleier, Lompo Batang, in Celebes, distant about 110 miles, and the high mountains of Flores, distant about 90 miles, are often visible. In the east monsoon the summits of the higher islands are generally hidden by heavy clouds.

Chart 935, plan of Tana Jampea.

Tana Djampea.—Anchorages.—Tana Djampea (Jampea), the largest of the western group of islands, is high, thickly wooded, and indented on the western side, off which lie many smaller islands; the numerous summits are nearly of the same elevation and are difficult to identify, except from westward, from which direction the peak, 1,703 feet (519^{m}1) high, is a useful mark for avoiding Taka Kapalle (page 492). A steep, somewhat pointed hill, 1,060 feet (323^{m}1) high, on a peninsula on the southern side of the island, is prominent owing to its isolated position. *See* view facing page 504.

Tana Malalla is the largest of the islands off the west coast of Tana Djampea, and is separated from the main island by a narrow winding passage, named Djalan Loepasang (Jalan Lupasang), with a least

Charts 941b, 942a, 1263, 2759a.

Chart 935, plan of Tana Jampea.

depth of 3 feet ($0^{m}9$), navigable for small craft, although a strong current sometimes runs through it. Northward of Tana Malalla are the high islets of Sarimpa, Katella, Sambioe (Sambiu), Senapang, and Goeroe (Guru), all covered with vegetation; the residence of the Government official, with a flagstaff, is situated on Katella. Bimbé, a saddle-shaped islet, lies off the north-western extremity of Tana Malalla, and about 3¼ miles farther north-north-westward of Bimbé is the low coral islet Djailamoe (Jailamu), with the small fishing village Sisiri on its south-western side.

Good anchorage may be obtained, in a depth of 15 fathoms ($27^{m}4$), although there is some swell in the east monsoon, in Labuan Kamajang, between the south-eastern side of Tana Malalla and the western side of Tana Djampea. Three shoals, with depths of from 2 to 3 fathoms ($3^{m}7$ to $5^{m}5$) over them, lie in the southern entrance to the passage between these two islands.

Anchorage can be obtained off Labuan Marégé, on the south coast of Tana Djampea, in a depth of 15 fathoms ($27^{m}4$), but there is little shelter here and the area is encumbered with numerous shoals. Foul ground, with some patches, which dry, extends one mile offshore from a position one mile eastward of Ujong Kambangragi (*Lat. 7° 09′ S., Long. 120° 41′ E.*), the western entrance point of Labuan Marégé, eastward to Ujong Paroemang (Parumang), the south-eastern extremity of Tana Djampea.

The wide bight on the northern side of Tana Djampea, between Ujong Torkoeboer (Torkubur), the north-eastern extremity, and Tanjong Torgao, the north-western extremity of the island, affords fairly good anchorage, in depths of from 15 to 16 fathoms ($27^{m}4$ to $29^{m}3$), off Garassi village. This anchorage is approached with the highest peak of Kajoe Adi (Kajuadi) (chart 3616), an island 11½ miles northward of Ujong Torkoeboer, in line with Batoe (Batu), bearing about 010° astern; Batoe is a very prominent islet, with a noticeable rock close southward of it, lying 3 miles north-westward of Ujong Torkoeboer. Shoal patches, with a least depth of 3¾ fathoms ($6^{m}9$) over them, lie within 1¾ miles south-westward of Batoe, and a reef with a depth of 2 fathoms ($3^{m}7$) over it, lies 2 miles westward of Ujong Torkoeboer and about 8 cables offshore; this reef is close eastward of the leading mark. The coastal reef extends fully half a mile off Garassi village.

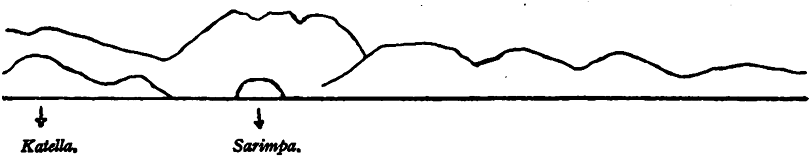
Reede Benteng.—Dangers.—Beacons.—Reede Benteng, off the west coast of Tana Djampea, affords anchorage for small vessels, in a depth of 11 fathoms ($20^{m}1$), with the south-eastern extremity of Goeroe bearing 066°, and the north-eastern extremity of Katella bearing 146°; larger vessels can anchor farther south-westward, in depths of from 14 to 17 fathoms ($25^{m}6$ to $31^{m}1$). Small vessels with local knowledge can also anchor in the basin eastward of Katella, sheltered in both monsoons, although the tidal streams are sometimes strong and squalls may occur; the channel leading to this basin is marked by two white beacons, each surmounted by a ball, standing on two detached reefs lying north-eastward of Katella; there are also some non-official beacons.

Two 3-fathom ($5^{m}5$) patches, the north-eastern of which is named Lana Pasingka, lie 8½ cables northward and 1¼ miles north-north-eastward, respectively, of the north-eastern extremity of Bimbé.

Charts 3616, 941b, 942a, 1263, 2759a.

Chart 935, plan of Tana Jampea.

A vessel bound for Reede Benteng from northward can approach with the middle of the eastern hills of Tana Malalla in line with Sarimpa, bearing 156°, although this mark is not very distinctive and leads very close south-westward of a 5-fathom (9^m^1) patch lying about 1¼ miles north-eastward of Lana Pasingka; a 3-fathom patch lies on the south-western side of this alignment and about one mile east-north-eastward of Lana Pasingka.



Eastern hills of Tana Malalla in line with Sarimpa, bearing 156°.

(*Original dated* 1931.)

The Government official resides on Katella (*Lat.* 7° *04′ S., Long.* *120° 36′ E.*), where there is a flagstaff.

The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 1696.

Bank westward of Tana Djampea.—On the bank extending westward from Tana Djampea are a number of small heads of coral, usually only slightly marked by discoloration, although the water is generally so clear that the bottom can be plainly seen at a depth of about 5 fathoms (9^{m}1). Passing vessels should avoid this bank, keeping outside the 100-fathom (182^{m}9) line; vessels proceeding to Tana Djampea from westward should cross the bank by steering for Bimbé, bearing 090°.

During the east monsoon, when passing westward of this bank, a west-going current, attaining a rate of fully 2½ knots, has been observed; this exceptional current may be due to the surface drift caused by the east monsoon banking against the east coast of Saleier and the islands southward of it and thence being deflected southward of them.

Taka Kapalle, on the south-western corner of the bank and 8½ miles west-south-westward of Bimbé, has a least depth of 2 fathoms (3^{m}7) over it and is marked by discoloration.

Sané Sané lies outside the north-western corner of the bank, about 7½ miles north-westward of Bimbé, and is a reef of sand, coral, and stones, which partly dries, with two sandbanks above water on its north-eastern side.

Charts 935, plan of Tana Jampea, and 1696.

Islands and bank northward of Tana Djampea.—Anchorages.—A narrow ridge, with very irregular depths over it, extends about 17 miles northward from Tana Djampea. Three islets lie on this bank; Batoe, the southern of these, has been described on page 491. Pandjang (Panjang), nearly 6 miles northward of Ujong Torkoeboer, is a sandbank covered with high trees; it is fringed by a reef, and a shoal, with a depth of 5 feet (1^{m}5) over it, lies about 2¼ miles north-westward of the islet. Kaoena (Kauna), about 4½ miles northward of Pandjang, is a wooded sandbank lying on a reef.

Charts 3616, 941b, 942a, 1263, 2759a.

Charts 935, plan of Tana Jampea, and 1696.

The passage between Batoe and the north coast of Tana Djampea can be used, taking care to avoid the 3¾-fathom (6^{m}9) patches lying within 1¾ miles south-westward of Batoe. The passage between Batoe and Pandjang is not recommended, as the depths here are very irregular. The passage between Pandjang and Kaoena can be taken, passing northward of the 5-foot (1^{m}5) shoal lying north-westward of Pandjang. There is a least depth of 3¾ fathoms (6^{m}9) in the passage between Kaoena and Kajoe Adi.

Strong currents have been observed on the bank northward of Tana Djampea, probably caused by the prevailing monsoon, and there are peculiar ripplings in places.

Chart 1696.

Kajoe Adi, lying on the northern end of the bank extending northward from Tana Djampea, rises nearly everywhere steeply from the sea, and consists mainly of three hills, Dato besar, the northernmost, with an elevation of 942 feet (287^{m}1), being the highest. The island is fringed by a steep-to reef, and several reefs, with depths of from 2 feet to 6 fathoms (0^{m}6 to 11^{m}0) over them, lie off the western side.

The native chief resides at Boné Lambéré (*Lat. 6° 47′ S., Long. 120° 47′ E.*), a village on the western side near the northern extremity of the island. In the east monsoon and in the transition periods anchorage can be obtained off Boné Lambéré, steering for the summit of the island, bearing 144°; when the 100-fathom (182^{m}9) line has been crossed the utmost caution is necessary, as the bottom rises very steeply and the anchor should be dropped almost immediately, with the northern extremity of the island bearing about 090°. There is a landing pier at Toenggarana village, situated in about the middle of the west coast.

In the east monsoon good anchorage may also be obtained off Toenggarana, in a depth of 27 fathoms (49^{m}4), with the western extremity of Kajoe Adi bearing 005° and Dato kechil, 114°.

Charts 935, plan of Boné Raté anchorage, and 3616.

Kalao and Boné Raté.—Kalao, which lies with Ujong Boné Oge, its western extremity, about 9 miles south-south-eastward of the south-eastern extremity of Tana Djampea, is an island, higher at the extremities than in the middle; the western peak, named Baringké, is 886 feet (270^{m}1) high, and the eastern, named Popokang, 1,102 feet (335^{m}9), both being good landmarks. Temporary anchorage can be obtained under the south coast of Kalao, in a depth of 7 fathoms (12^{m}8), with Baringké bearing 039°, but a buoy must be laid first where it is suitable to drop the anchor. There is also anchorage off Béroe (Béru) village, near the south-eastern extremity of the island, in a depth of 38 fathoms (69^{m}5), and in the west monsoon vessels lie here safer than off Boné Raté.

Boné Raté is separated from the eastern end of Kalao by a safe channel about one mile wide; it is much lower than Kalao, and has three flat hills, the highest, named Bingkoeng (Bingkung), lying near the northern extremity of the island and attaining an elevation of 492 feet (150^{m}0). Boné Raté village, one of the principal places of export for products of the adjacent islands, is situated on the west coast of the island and is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij; the village is of considerable size, and may

Charts 3616, 941b, 942a, 1263, 2759a.

Charts 935, plan of Boné Raté anchorage, and 3616.

be identified by a large tree. There is anchorage off Boné Raté village, in a depth of 39 fathoms ($71^{m}3$), with the large tree bearing 112°; a 2-foot ($0^{m}6$) patch lies about half a mile westward of the village, and about 3½ cables farther westward is a 3¾-fathom ($6^{m}9$) patch.

Chart 3616.

Marianne reef.—Kajoe Pangang.—Marianne rif or Taka Bassi, which dries, lies about 8 miles south-eastward of Boné Raté. Some detached reefs, which are scarcely visible by discoloration, lie within the 100-fathom ($182^{m}9$) line southward and south-eastward of the main reef.

Kajoe (Kayu) Pangang (*Lat.* 7° 28′ *S., Long.* 121° 26′ *E.*), about 16 miles east-south-eastward of Boné Raté, consists of two small rocky islets covered with vegetation, and visible about 10 miles, lying on the southern side of a reef which is about 1¼ miles long in a north-westerly and south-easterly direction.

Madoe, Kalao Toa and Karompa eilanden.—Anchorages.—Madoe (Madu), the southernmost of these hilly islands, lies about 35 miles east-south-eastward of Boné Raté; there is a plateau in the middle of the island, 394 feet ($120^{m}1$) high. The villages Kampeté and Oré Satonda are situated on the northern and southern coasts, respectively, near the eastern end, but there is no anchorage. A sandbank above water, with a couple of huts on it, lies close off the south-eastern extremity of the island.

Kalao Toa, separated from Madoe by a deep passage, 3 miles wide, is the principal and most populated island of this group. Cornelia piek, on the south-eastern side, is 1,122 feet ($342^{m}0$) high, and is sharp and noticeable when seen from southward and eastward; the south-western peak of the island, 1,083 feet ($330^{m}1$) high, appears as the highest summit when seen from westward, and is somewhat conical in shape. Goraoe Oepa (Gorau Upa), where the native chief resides, is situated on the south-western side of the island; anchorage can be obtained by vessels with local knowledge off this village, close northward of a 3¾-fathom ($6^{m}9$) reef, with the south-west peak bearing 055°, and the points on the coast eastward in line, bearing 094°. Boeranga (Buranga) village, on the west coast, may be identified by some coconut plantations. Anchorage can also be obtained very close to the coastal reef extending from the northern, eastern, and south-eastern sides of Kalao Toa.

Karompa eilanden, consisting of Karompa Lompo, Karompo Tjadi (Chadi), Anak Karompa, and the low islet Giling Soei (Sui), which is covered with vegetation, lie on the eastern edge of an extensive reef, which dries, named Taka Lambaéna. Karompa Lompo is the only island permanently inhabited, and there is good anchorage for vessels with local knowledge with Karompa village, situated on the east coast, in line with the village on Laoet, a small islet lying on the edge of the coastal reef, bearing 282°, and the eastern extremities of Karompa Lompo and Karompa Tjadi in line. A reef, with a least depth of 1¾ fathoms ($3^{m}2$) over it, lies about 3 cables southward of Laoet.

Taka Lambaéna is very steep-to and has a noticeable rock above water, on its north-western extremity; about 9 cables southward of this rock is a small sandbank just above water. Pasir Sangiang is a steep-to reef, which dries, one mile north-westward of the north-western extremity of Taka Lambaéna; Sangi Sangiang (*Lat.* 7° 07′ *S., Long.*

Charts 941b, 942a, 2759a.

Chart 3616.

121° 27′ E.), about 2½ miles north-westward of Pasir Sangiang, is a small coral islet, lying on a reef which dries.

Tijger eilanden.—Tijger (Tiger) eilanden, or Taka Boné Raté, consist of an archipelago of coral islands under formation, much resembling Duizend eilanden (page 70), off the north coast of Java, and occupy a large area between Taka Lambaéna and the southern extremity of Saleier. These islands are only visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, which call at Radjoeni (Rajuni) kechil for copra; the ordinary navigational routes lie far outside the archipelago.

The central part of the archipelago consists of numerous reefs, which dry, and between them and the barrier formation along the 100-fathom (182^{m}9) line, there is a generally wide, navigable channel, which can usually be navigated by eye, and the same applies to the various passages through the barrier giving access to it. The large reefs are nearly always marked by discoloration when covered, but such is not always the case with the smaller ones. The difference in appearance at high water, when all the reefs are practically covered, and at low water, when all the large reefs are dry, is very marked.

There are fairly large villages on the islands Latondoe (Latondu) besar, Radjoeni (Rajuni) besar, Radjoeni kechil (*Lat. 6° 32′ S., Long. 121° 00′ E.*) and Tinabo besar, the positions of which can best be seen on the chart in the northern part of the archipelago, also on Djinatoe (Jinatu), on the western side, about 15 miles southward of Latondoe besar.

Anchorage may be obtained by vessels with local knowledge off the east coast of Radjoeni kechil, approaching it by the passage between Latondoe besar and a reef lying about one mile eastward, or from southward by the inner passage eastward of Djinatoe and Lantigiang, about 2½ miles northward. The islands in the southern part, except the Pasi Teloe group (*see* below), are merely sandbanks, mostly covered with vegetation.

Two sandbanks, which dry, lie about 3½ miles outside the 100-fathom (182^{m}9) line on the south-eastern side of the archipelago; the north-eastern of these is named Karang Sela. Two extensive reefs, which dry, named Taka Lamoengan (Lamungan) and Taka Garlarang, lie eastward of the northern part of the archipelago, and Belang Belang is an islet close off the northern extremity.

Chart 935, plan of Pasi Telu islands.

Pasi Teloe (Telu) eilanden, near the southern edge of the archipelago, consist of Laoet (Laut), Tengah, and Radja (Raja), which are almost entirely planted with coconut trees and are inhabited. In the channels between these islands the tidal stream runs northward with the rising tide, and southward with the falling tide.

Chart 3616.

Outlying islands.—Kaoena (Kauna) or Postpaard, an island, 17 miles eastward of Madoe, is an uninhabited, wooded coral islet, 148 feet (45^{m}1) high, with a sandbank above water close within the south-eastern extremity of the fringing reef. A detached coral reef, with a depth of 2½ fathoms (4^{m}6) over it, lies about 2 cables off the north coast.

Kakabia or Baars eiland, about 32 miles north-north-eastward of Kaoena, is 125 feet (38^{m}1) high, rocky, wooded, and uninhabited;

Chart 3616.

numerous sea birds and rats live on the island, and some of the trees and rocks are white from birds' droppings. The island is fringed by a coral reef, which extends about 1¼ miles east-south-eastward and contains a deep basin, inaccessible for vessels; a detached reef, which dries, lies off the north-eastern side of this reef, and is separated from it by a narrow, deep channel.

GOLF VAN BONI.—Golf van Boni, separating the two southern peninsulas of Celebes, is entered between Tanjong Lassa (page 484) and Kabaëna, an island about 80 miles eastward. Numerous reefs lie within the 100-fathom (182^{m}9) line off the southern part of the western shore, but there is an inner passage, marked by beacons, by which various places on the coast can be reached.

Vessels proceeding from Straat Saleier to the head of the gulf by the outer route, which lies outside the 100-fathom (182^{m}9) line, must depend almost entirely on astronomical positions, as the land cannot be safely made until near Tanjong Siwa, about 116 miles northward of Tanjong Lassa (*Lat. 5° 37′ S., Long. 120° 29′ E.*).

All the reefs which dry lying near the 100-fathom (182^{m}9) line are well marked by discoloration and often break in the South-east monsoon. Karang Limpogeh, the easternmost danger, 44 miles north-north-eastward of Tanjong Lassa, is fairly noticeable, but this bare sand patch only uncovers over a small part at high water.

Local winds and weather.—The following particulars of winds and weather were gathered from observations made during the survey of Golf van Boni:—

In the southern part of the western side, from February to April, rain and showers occurred for 28 out of 78 days' observation. The sky was always cloudy, especially in the daytime; the clouds came up with the sea wind in the forenoon, packed in dark masses against Lompo Batang, and burst into rain in the afternoon. Farther northward, during December, 1903, and January, 1904, the wind was mostly from the west and north-west, quickly raising a turbulent sea in the daytime. At the head of the gulf, during July, the wind was weaker and the sea calm.

On the eastern side of the gulf there appears to be much rain during the South-east monsoon. At the end of April and during May, at the entrance to the gulf, the South-east monsoon blew freshly, with squalls and much rain, swell, and sea; farther northward the wind was less, but the rain greater. June and July were very unsettled, with winds from the south-east, but sometimes blowing from westward for several days. In August the rain gradually ceased, and the weather became more settled. *See* also remarks on the weather on page 485.

Tidal streams.—Little is known of the horizontal movement of the water in Golf van Boni, but outside the ebb and flood tidal streams of the larger river mouths, appears to consist merely of weak and irregular wind drifts of a more or less local nature. The direction of the current southward of the gulf is in accordance with the monsoon, being west-going from June to October and east-going from December to May.

WESTERN SIDE OF GOLF VAN BONI.—Coast.—The coast between Tanjong Lassa and Tanjong Laboea (Labua), 17½ miles north-

Charts 941b, 942a, 1263, 2759a.

Chart 3616.

ward, is high and steep ; it can be approached closely, but the bottom is too steep to afford safe anchorage. Tanjong Laboea is very noticeable owing to its white rock formation. Tiro village is situated at the head of Tiro baai, which is entered about 8½ miles northward of Tanjong Lassa, and there is a good landing place on the beach near the village, although there is no safe anchorage in the bay ; Sungei Tiro flows out near the village, and is navigable for praus up to about 3 miles above its mouth.

The coast between Tanjong Laboea and Tanjong Kopang, 9½ miles north-westward, is moderately steep, but northward of the latter point there is a strip of low land. The only good landmark is Sindjai (Sinjai), a hill, 863 feet (263^{m}0) high, about 5 miles inland and 20 miles north-westward of Tanjong Laboea.

There is indifferent anchorage in Reede Kadjang, a bight in the coastal reef 2¾ miles north-westward of Tanjong Laboea ; there is a stone pier on the southern side of the bight, but the bottom is too steep for anchoring here. The best anchorage is in the north-western corner of the bight, in a depth of not less than 15 fathoms (27^{m}4), but vessels remaining for any length of time should moor, as there is little room for swinging. The residence of the Government official, with a prominent flagstaff, is situated on a hill on the southern side of the bight. Kadjang (Kajang) is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij ; there is telephonic communication with Makasser.

Sungei Barengang flows out about 4 miles north-westward of Tanjong Kopang (*Lat.* 5° 13′ *S., Long.* 120° 19′ *E.*), and the coast for about 3 miles northward of this river is bordered by a sandy beach, the land sloping up gradually to hills behind.

Off-lying reefs.—Beacons.—Several small reefs, not always marked by discoloration, lie within a distance of about 2½ miles of the coast between the mouth of Sungei Lolisang, about 2½ miles north-westward of Kadjang, and Sindjai (Sinjai), about 10 miles farther north-westward ; this area should, therefore, be avoided.

Mala Mala is a reef, which dries, lying about 3 miles offshore and 5 miles northward of Tanjong Laboea ; a black beacon, surmounted by a cone, and equipped with a reflector, stands on its north-eastern edge.

Melambiri, with its southern extremity about 2½ miles eastward of Mala Mala, also dries ; two 3¾-fathom (6^{m}9) patches, named Kalang, lie about one mile south-westward of the southern extremity of Melambiri.

Boenging Keke is a reef, which dries, lying about 5 miles northward of Mala Mala ; it is marked by a stone beacon equipped with two reflectors, vertically disposed.

Malilla, with a depth of 3 fathoms (5^{m}5) over it, lies about 3 miles westward of Boenging Keke, and is not marked by discoloration ; Behoeloe, 2½ miles westward of Malilla and about one mile east-north-eastward of the entrance to Sungei Barengang, can be seen under favourable circumstances.

Sindjai and Balangnipa.—Sindjai, the headquarters of a Government official, is situated on Sungei Sindjai, about 2 miles within its mouth ; the channel giving access to the river, over the wide mudbank, which dries, fringing the coast here, is only suitable for small praus.

Charts 941b, 942a, 1263, 2759a.

Chart 3616.

Vessels with local knowledge will find it more convenient, therefore, to anchor off the mouth of Sungei Tangka, which flows out about 1½ miles farther north-north-eastward. Balangnipa, a well-populated village, is situated about 2 miles up this river.

Reede Balangnipa is the area westward of the meridian of the beacon on Boni Boni rif (page 499) included between a line drawn from the summit of Sindjai hill to the southern extremity of Boeloenroewe (Bulunruwe), and the parallel of the beacon on Boenging Keke.

The best anchorage is with the mouth of Sungei Tangka, bearing about 292°, and Tjinnoeng (page 499) in line with the islet Beloppo (*see* below), bearing about 006°, but vessels must not approach into a depth of less than 11 fathoms ($20^{m}1$), as the bank off this river is very steep-to. The landing place is at Rea Rea village, on the southern side of the mouth. The roadstead is visited by vessels of the Koninklijke Paketvaart Maatschappij. There is telephonic communication between Sindjai and Makasser.

Directions.—From a position about one mile eastward of Tanjong Laboea a vessel should steer for Boeloenroewe, an island about 6 miles eastward of the entrance to Sungei Tangka, bearing 354°, passing between Mala Mala and Melambiri. When Sindjai hill (*Lat. 5° 04′ S., Long. 120° 13′ E.*) bears 297° she should steer for it on that bearing, passing southward of the beacon on Boenging Keke and northward of Malilla; this course leads to the anchorage off Sungei Tangka.

Off-lying islands.—Boeloenroewe, the southernmost of a group of islands lying off the coast between the entrance to Sungei Sindjai and Tanjong Antjoe (Anchu), about 5 miles north-north-eastward, has a very prominent hill in its southern part, 827 feet ($252^{m}1$) high; in the northern and lower part of the island there is a village and a coconut plantation.

Lanreanreang, about 2½ miles northward of Boeloenroewe, is a coral islet, with a few coconut trees on it, lying on a large reef. Batanlampe, about 2 miles north-eastward of Lanreanreang, appears as a saddle from northward and southward, the western peak being the higher. Leang Leang lies on a reef one mile north-eastward of Boeloenroewe, and has a large village on its south-western side, noticeable from southward. The remaining islands have no distinctive features The reefs on which these islands lie can all be seen with good visibility.

Anchorage may be obtained by vessels with local knowledge eastward of Kamboene, an island about 6 cables north-north-eastward of Leang Leang.

Coast.—The hills in the southern part of the coast which are connected with the mountainous land of Bonthain (page 420), increase considerably in elevation northward of Sindjai, rising gradually behind the low coastal land.

Between the mouth of Sungei Sindjai and Tanjong Antjoe there is a strip of low, marshy land about one mile wide along the coast; between Tanjong Antjoe and Tanjong Meroe, about 7 miles northward, the coast becomes more undulating. Meroe (Meru) heuvels, near Tanjong Meroe, are two prominent summits; Patjongi (Pachongi), a conical mountain 2,658 feet ($810^{m}2$) high, lies about 10 miles north-westward of Tanjong Meroe, and is visible along the entire coast between Tanjong Laboea and Tanjong Tippoeloewe (page 501). The islets Beloppo and Betah lie on the coastal reef extending about 8 cables from Tanjong Antjoe

Chart 3616.

and Tanjong Meroe, respectively. Between Tanjong Meroe and Tanjong Patiro, about 19 miles north-north-eastward, there is a wide plain along the coast, the land rising within to spurs from the somewhat isolated hills Tjinnoeng (Chinnung) and Damara; the former, which is 824 feet (251^{m}2) high, lies about 7 miles west-south-westward of Tanjong Patiro and has a flat summit, whilst the latter, 499 feet (152^{m}1) high, situated about 3½ miles westward of Tanjong Patiro, has a fairly conical summit covered with tall trees. Tanjong Patiro is a prominent, rocky point, 354 feet (107^{m}9) high, rising gradually to a hilly ridge, on which are three trees visible about 10 miles in clear weather.

Sungei Salangkèto discharges close south-westward of Tanjong Salangkèto, about 7 miles north-eastward of Tanjong Meroe, and has three mouths, but only the middle one can be entered; there is a depth of only one foot (0^{m}3) on the bar outside, and there are fishing stakes on either side of the channel. Sungei Kadjoe (Kaju) flows out about 6 miles northward of Tanjong Salangkèto, and the coast in this vicinity is covered with mangroves, as also is that near Sungei Salangkèto; there are some fishing huts near the mouth of Sungei Kadjoe, and the general depths here are from one to 3 feet (0^{m}3 to 0^{m}9).

From southward of Tanjong Salangkèto to northward of Tanjong Lepang, about 5½ miles northward, the coast should be given a wide berth owing to the small reefs, which are not clearly marked by discoloration, lying as much as 3½ miles offshore; northward of Tanjong Lepang the coast may be safely approached again.

Sungei Patiro flows out about 2½ miles south-westward of Tanjong Patiro and has two mouths; the southern is the easier to navigate and affords the shortest route for large praus to Benteng village, situated about 2 miles up the river. Patiro village is situated at the head of a small bay close south-westward of the mouth of Sungei Patiro.

Off-lying reefs.—Beacons.—The numerous reefs lying westward of Boeloenroewe and Batanlampe (*Lat. 5° 03′ S., Long. 120° 26′ E.*) only dry at low water during May, June, November, and December; when covered they are barely marked by discoloration owing to the sediment carried down by the rivers on the coast in the vicinity. Boni Boni is a reef lying about 1¾ miles south-eastward of Tanjong Antjoe and about 1½ miles offshore; a black beacon, surmounted by a cone, stands on its eastern edge. A 3½-fathom (6^{m}4) coral patch lies about one mile southward of Boni Boni. A black beacon, surmounted by a cone, marks the eastern edge of a reef lying about 3 miles east-south-eastward of Boni Boni, and a similar beacon stands on the eastern edge of a reef lying about 3 miles north-eastward of Boni Boni.

The reefs off the coast northward of Tanjong Antjoe are plainly marked by discoloration, and most of them dry. Twee Gebroeders, lying about 3½ miles east-south-eastward of Tanjong Meroe, are generally marked by discoloration when covered and by white sandbanks at low water. The north-western edge of Tenghai, a reef about 5 miles eastward of Tanjong Meroe, is marked by a white beacon, surmounted by a ball.

A white beacon, surmounted by a ball, marks the western edge of a reef lying about 6 miles east-north-eastward of Tanjong Salangkèto. Dwars in den weg, about 3½ miles southward of Tanjong Patiro and about 3 miles offshore, is marked by a black beacon surmounted by a cone; Boeginang (Buginang), a reef, nearly 1½ miles eastward of

Charts 941b, 942a, 1263, 2759a.

Chart 3616.

Tanjong Patiro, has a white beacon, surmounted by a ball, on its western edge.

Chart 2674, plan of Bajowe roadstead.

Reede Badjowe.—Dangers.—Beacons.—Reede Badjowe (Bajowe) is bounded by the parallel and meridian of the beacon about 3 miles eastward of the head of the pier at Badjowe (*see* below), and by the parallel of the beacon about 2¼ miles east-north-eastward of the head of the pier.

Amelia riffen, with a least depth of 3 feet ($0^{m}9$) over them, lie about 4¼ miles eastward of the head of the pier, and are only slightly marked by discoloration; a black beacon, surmounted by a cone, stands on the northernmost of these reefs. A reef, which dries, lies 2¾ miles eastward of the pier-head, and is marked at its north-eastern extremity by a black beacon, surmounted by a cone. A 2½-fathom ($4^{m}6$) patch lies 5½ cables eastward of this beacon. A reef, which dries, marked at its northern extremity by a black beacon, surmounted by a cone, lies about one mile eastward of the pier-head. Several small reefs lie within one mile north-eastward of this beacon, two of them being marked by white beacons, surmounted by a ball.

Totopela reef, which dries, lies about 3½ miles east-north-eastward of the pier-head, and is marked at its western edge by a white beacon, surmounted by a ball. Torea rif lies about 2¾ miles north-eastward of the pier-head, and is marked at its eastern extremity by a black beacon, surmounted by a cone, and equipped with reflectors. Lambeina reef lies three-quarters of a mile eastward of Totopela rif.

Anchorage.—Directions.—The usual anchorage is in depths of from 4½ to 5 fathoms ($8^{m}2$ to $9^{m}1$), with good holding ground, with the head of the stone pier, which dries, at Badjowe, bearing 264°, distant 2½ miles. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

A vessel approaching Reede Badjowe from southward should steer 342°, passing between the reef marked by a beacon about 2¾ miles eastward of the pier-head and the 2½-fathom ($4^{m}6$) patch 5½ cables eastward of it and thence steer for the anchorage. Approaching from northward or eastward the vessel should pass between Torea and Totopela reefs. During the South-east monsoon the beacon on Torea rif is sometimes difficult to distinguish.

Badjowe.—Badjowe (Bajowe) village stands on the coast about 8 miles north-north-westward of Tanjong Patiro (*Lat. 4° 39′ S., Long. 120° 28′ E.*), and there are several large villages and coconut plantations between. Badjowe is connected by a good road with Watampone (chart 3616), the capital of the district, standing on a well-cultivated plain about 3½ miles inland. Badjowe is connected with the general telephone system.

Chart 3616.

Directions.—*Sindjai to Badjowe.*—From the anchorage off Sungei Tangka a vessel should steer about 027° to pass close eastward of the black beacon, surmounted by a cone, on the eastern side of Boni Boni, taking care to avoid the 3½-fathom ($6^{m}4$) coral patch about one mile southward of the reef; thence she should steer for Betah, the islet close off Tanjong Meroe, bearing about 354°, until Beloppo, the islet close off Tanjong Antjoe, bears 312°, when she should steer about 032°, passing north-westward of the beacon on Tenghai, bearing in

Chart 3616.

mind that this reef extends about 2¼ cables northward of the beacon.

A vessel proceeding to Badjowe from southward, and not calling at Sindjai, can follow the directions for Sindjai given on page 498 until southward of the beacon on Boenging Keke; she should then pass westward of this beacon and steer 359° so as to pass between the islands east-north-eastward of Sindjai (page 497) and the two black beacons on the reefs westward of them. When Betah bears 280°, and the vessel is eastward of Twee Gebroeders, she should steer 032° as directed above.

Java bank lies about one mile north-westward of the beacon on Tenghai, and the vessel should continue to steer 032° so as to pass between this beacon and a 3¾-fathom ($6^{m}9$) patch lying about half a mile eastward of Java bank, and thence eastward of a 3¾-fathom ($6^{m}9$) patch lying about 3¼ miles east-south-eastward of Tanjong Salangkèto. When Tjinnoeng bears 316° she should alter course to 003°, passing eastward of the black beacon on Dwars in den weg and westward of the white beacon on Boeginang; from abreast the latter beacon she should steer 342° for Reede Badjowe, but as this course leads over a 3¾-fathom ($6^{m}9$) patch lying about 2 miles northward of Tanjong Patiro, vessels of moderate draught should steer 003° for a further 2 miles so as to pass eastward of this shoal. For directions for approaching the anchorage in Reede Badjowe, *see* page 500.

Coast.—Off-lying dangers.—Tanjong Tippoeloewe (Tippuluwe), 4¼ miles northward of Badjowe pier, is a high, rocky promontory, and appears as an island from eastward and northward. The coast thence to Tjipalaka village, 2¾ miles north-westward, is high, but farther northward it is low and monotonously wooded; there are some large trees at Tjipalaka, particularly noticeable northward.

Several reefs lie within the 100-fathom ($182^{m}9$) line northward of Tanjong Tippoeloewe (*Lat. 4° 29′ S., Long. 120° 24′ E.*), and, owing to the mud carried down by Sungei Tjenrana (Chenrana), these are seldom marked by discoloration; Tabako, a reef, about 7 miles north-north-eastward of Tanjong Tippoeloewe and about 3 miles off the mouth of Sungei Tjenrana, is marked by a white beacon, surmounted by a ball, near its southern extremity.

Sungei Tjenrana.—Reede Palima.—Sungei Tjenrana flows out from Lake Tempe, about 25 miles inland, in a general south-easterly direction to the sea, where it forms a delta; the principal arms of the delta are Bawana Watoe, Muara Tjappië kechil, Muara Tjappië besar, Muara Tjenrana, and Kaeil. Muara Tjappië kechil is the usual entrance, and the least depth on the bar off its mouth is one foot ($0^{m}3$) and 5 feet ($1^{m}5$) at mean water level.

Palima, a trading place of some importance, is situated on Sungei Tjenrana about 2 miles from the coast, the land around being marshy and unhealthy; there is a small wharf at the eastern end of the village. At high water levels, during April, May, and June, Sungei Tjenrana is navigable for small vessels of 4 feet ($1^{m}2$) draught up to Pampanoea village, about 16 miles above Palima.

Reede Palima lies off the delta of Sungei Tjenrana, and is bounded by the parallel and meridian of the beacon on Tabako, and by the parallel of the northern extremity of Langkero.

The usual anchorage, for vessels with local knowledge, is in depths of

Charts 941b, 942a, 1263, 2759a.

from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), off the entrance to the channel over the coastal bank leading to Muara Tjappié kechil and Muara Tjappié besar, and about 2½ miles west-north-westward of Tabako; two mooring buoys, belonging to the Koninklijke Paketvaart Maatschappij, lie in the roadstead. Vessels of this company visit the roadstead regularly. Palima is connected to the general telephone system.

Directions.—*Badjowe to Palima.*—A vessel proceeding from Reede Badjowe to Palima should pass between the reefs Totopela and Torea, and when past the latter steer for the white beacon on the southern side of Tabako, taking care to avoid a 3¼-fathom ($5^{m}9$) patch lying about 1¾ miles south-south-eastward of this beacon; thence steer for the roadstead, passing at least 2¾ cables southward of the beacon on Tabako, as some rocks, with depths of less than 3 fathoms ($5^{m}5$) over them, lie outside this beacon. A 4¾-fathom ($8^{m}7$) patch lies about one mile south-south-westward of Tabako beacon.

A vessel making for Reede Palima from northward should keep outside the 100-fathom ($182^{m}9$) line until a westerly course can be steered to pass 3 cables southward of the beacon on Tabako.

Coast.—From Sungei Tjenrana to Tanjong Loko Loko, about 36 miles northward, there are no distinctive features either on the coast, except for a large tree about 3¼ miles south-south-westward of Tanjong Loko Loko, or on the land behind; a mudbank, which dries, mixed with coral, in places, extends from one to 2 miles offshore.

A white iron ball beacon stands on the edge of the bank midway between Sungei Tjenrana and Tanjong Loko Loko.

Between Tanjong Loko Loko (*Lat. 3° 44′ S., Long. 120° 27′ E.*) and Tanjong Siwa, about 3¼ miles northward, the coast is low and covered with trees, and can be safely approached; vessels proceeding by the outer route to the northern part of Golf van Boni can make the land by the latter point. Sungei Siwa flows out close southward of Tanjong Siwa, but is only navigable for praus.

Off-lying dangers.—Numerous reefs lie within the 100-fathom ($182^{m}9$) line and as much as 6½ miles off the coast between Sungei Tjenrana and Tanjong Loko Loko, and possibly more may exist than are shown on the chart; by keeping eastward of the meridian of 120° 32′ E. vessels will pass outside all these dangers. Only those lying near the 100-fathom ($182^{m}9$) line are usually plainly seen. There are frequently false discolorations outside this line. The positions of these dangers can best be seen on the chart.

Coast.—Between Tanjong Siwa and Tanjong Djene (Jene), about 26 miles northward, the aspect of the land changes, some hills rising near the coast and a high mountain range some distance inland. Babang, a hill, about 2 miles westward of Tanjong Babang, about 7 miles northward of Tanjong Siwa, is difficult to identify; there is a prominent mountain about 7½ miles northward of Babang hill and 2½ miles west-south-westward of Tanjong Tjimpoe (Chimpu). Labenana or Zadelberg, 1,319 feet ($402^{m}0$) high, about 8 miles westward of Tanjong Djene, is very noticeable. Latimodjong (Latimojong) gebergte, 11,336 feet ($3{,}455^{m}2$) high, lies about 20 miles inland, but has no conspicuous peaks. Several small rivers flow out between Tanjong Siwa and Tanjong Djene, but they are only navigable for praus; the principal of these is the Djenemaëdjae, which discharges close southward of Tanjong Djene and has a least depth of one foot ($0^{m}3$) over the

Chart 3616.

bank off the mouth. There is good anchorage northward of Tanjong Siwa for vessels with local knowledge, in a depth of about 5½ fathoms ($10^{m}1$), and northward of Tanjong Polo, about 2½ miles northward of Tanjong Babang, in a depth of 13 fathoms ($23^{m}8$); the latter anchorage must be approached from northward.

Off-lying dangers.—Beacon.—Pasi Belongka lies about 2 miles eastward of Tanjong Polo, and another reef lies about three-quarters of a mile southward of Pasi Belongka.

Lamunre, a reef with a depth of 1¾ fathoms ($3^{m}2$) over it, lies about 4¾ miles north-eastward of Tanjong Tjimpoe, and is marked on its eastern side by a black beacon, surmounted by a cone.

Coast.—Light.—Tanjong Djene is a low point, but may be identified by the light-beacon on the bank, which dries, extending about half a mile north-eastward from the point; this bank is steep-to, and, as Sungei Djenemaëdjae flows out through it, there is the possibility that it may be extending seaward. Tanjong Djene is an important landmark for vessels proceeding to Palopo, on the western side of the head of Golf van Boni. By day, whether either the inner route or the outer route have been taken through the gulf, it is always advisable to make the land in the vicinity of Tanjong Siwa, and then proceed northward in sight of land; at night, vessels should keep outside the 100-fathom ($182^{m}9$) line throughout the gulf, and then sight Tanjong Djene light on a course that will take them well outside Lamunre. Although little is known of the currents and tidal streams in the gulf, a vessel will frequently experience a northerly and easterly set. Attention is called to the fact that, having passed northward of Tanjong Djene, rain squalls may be expected almost every night in the western part of Golf van Boni, and, when out of sight of the light in this point, there are no other landmarks.

A light (*Lat. 3° 15′ S., Long. 120° 26′ E.*) is exhibited, at an elevation of 30 feet ($9^{m}1$), from a white beacon, 29 feet ($8^{m}8$) in height, on the north-eastern extremity of the bank extending from Tanjong Djene.

HEAD OF GOLF VAN BONI.—Coast.—The head of Golf van Boni, between Tanjong Djene and Tanjong Tabako, 28½ miles east-south-eastward, is greatly encumbered with reefs in the eastern part, within the 100-fathom ($182^{m}9$) line. Owing to the numerous small reefs which dry lying in the area eastward of the meridian of 120° 34′ E., and between the parallel of 2° 53′ S. and the 100-fathom ($182^{m}9$) line, navigation is inadvisable in this part, especially as there are few landmarks for fixing the vessel's position.

The coast between Tanjong Djene and Tanjong Boea (Bua), 15½ miles north-westward, is low; Tanjong Olang, 3¾ miles north-westward of Tanjong Djene, is a low, inconspicuous point covered with mangroves. From the vicinity of Tanjong Djene the mountains and hills behind Palopo and north-westward of Tanjong Boea will be sighted; the most important of these are Walinrang, about 13 miles north-north-westward of Tanjong Boea and about 1,650 feet ($502^{m}9$) high, and Beteng, 873 feet ($266^{m}1$) high, about 9 miles north-north-westward of Tanjong Boea and of a light-green colour. *See* view facing page 504.

Outlying reefs.—Bali reefs lie about 10 miles east-north-eastward of Tanjong Djene and near the 100-fathom ($182^{m}9$) line; Naber reefs lie about 10 miles north-north-eastward of the same point, and

Charts 941b, 942a, 1263, 2759a.

Chart 3616.

Bron reef lies about 7 miles north-north-eastward of Tanjong Olang. All these reefs dry; the sea in this neighbourhood is much discoloured by the water from the rivers, and, after heavy rains, thick tree trunks are carried far out to sea. Little is known of the tidal streams in the northern part of Golf van Boni, but a constant east-going stream has been reported frequently near Bron reef.

Chart 2674, plan of Palopo bay.

Reede Palopo.—Dangers.—Anchorage.—Reede Palopo is situated in a bay in the north-western corner of the head of Golf van Boni, and is bounded by the arc of a circle drawn with a radius of 2 miles from the head of the pier.

Liboekang (Libukang) is a rocky islet, 203 feet ($61^{m}9$) high, lying on the broad coastal bank extending from the northern shore of the bay and generally stands out plainly against the background. The large village of Palopo, named Wara by the inhabitants, is the capital of the district; it is situated on an insignificant river, and comprises a number of villages, all bearing different names. There is considerable native trade with adjacent villages and also with Makasser. Vessels of the Koninklijke Paketvaart Maatschappij visit the roadstead regularly. Palopo is connected to the general telephone system. There is a harbour doctor.

A pier, with a green hut at its head, extends from the shore near the mouth of the river to the edge of the reef situated about 6 cables east-north-eastward. The pier has a landing stage for boats, with depths of from 4 to 5 feet ($1^{m}2$ to $1^{m}5$) alongside.

There are several reefs not marked by discoloration in the bay; their positions may best be seen on the chart.

There is good anchorage, in a depth of 6 fathoms ($11^{m}0$), but small vessels with local knowledge can anchor closer in, in a depth of 3¾ fathoms ($6^{m}9$); the holding ground is excellent. At low water it is difficult for boats to approach the head of the pier.

Chart 3616.

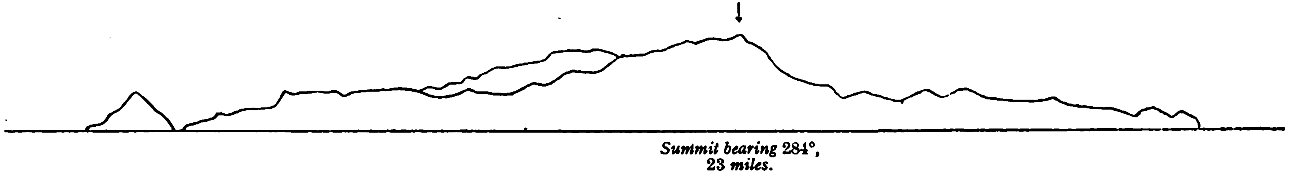
Coast.—Anchorage.—The western part of the northern shore of Golf van Boni is low, the mouths of streams affording the only landmarks. Near Saloeana (Saluana) village (*Lat. 2° 39′ S., Long. 120° 41′ E.*), about 35 miles north-eastward of Palopo pier, ridges from the massive Tampogeh gebergte approach the coast, and in the low plain eastward of Sungei Wotoe (Wotu), which flows out about 6½ miles eastward of Saloeana, there are several scattered hills; the most noticeable of these are Kramboea (Krambua), 650 feet ($198^{m}1$) high, and Maliowo, 1,319 feet ($402^{m}0$), the latter having a sharp peak. Tampogeh gebergte, which attains an elevation of 9,784 feet ($2{,}982^{m}2$), has no peaks identifiable for fixing a vessel's position. *See* view facing this page.

There are no dangers outside the 10-fathom ($18^{m}3$) line, until southward of the parallel of 2° 53′ S., as mentioned on page 503; the water is muddy within a distance of from 4 to 5 miles of the coast.

There is good anchorage for vessels with local knowledge, in depths of from 6 to 7 fathoms ($11^{m}0$ to $12^{m}8$), eastward of the reefs, which dry, off the mouth of Sungei Wotoe; this anchorage should be approached by steering for a prominent clump of trees near the mouth, bearing 326°, which leads through the channel in the coastal bank; this channel is marked on either side by unofficial beacons; an unofficial

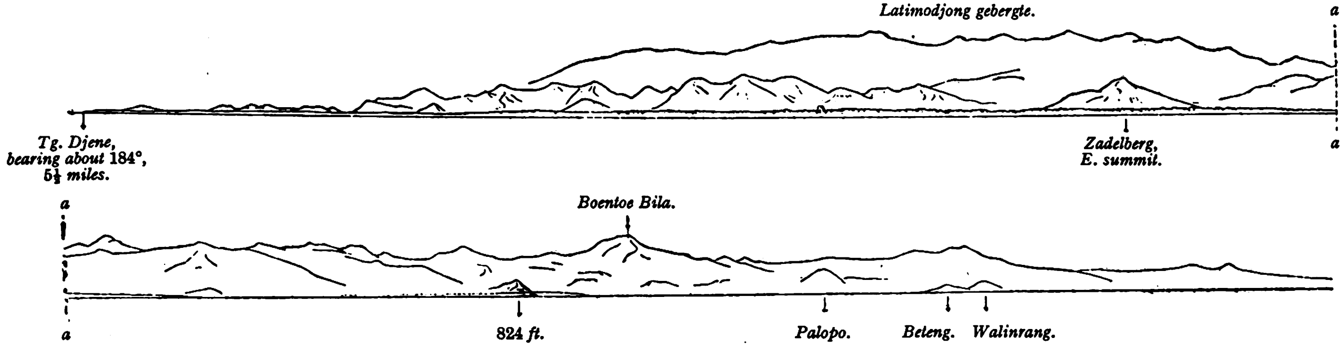
Charts 941b, 942a, 1263, 2759a.

To face page 504.



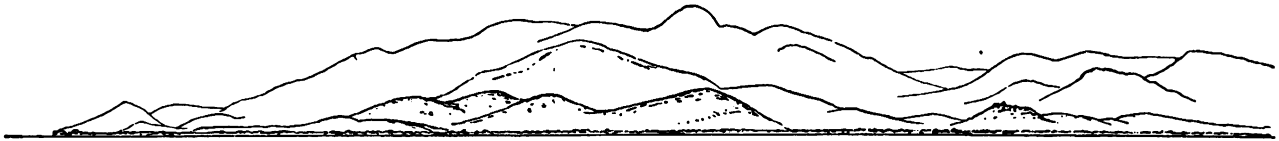
Tana Djampea.

(*Original dated* 1931.)



View, in two parts, of north-western part of Golf van Boni.

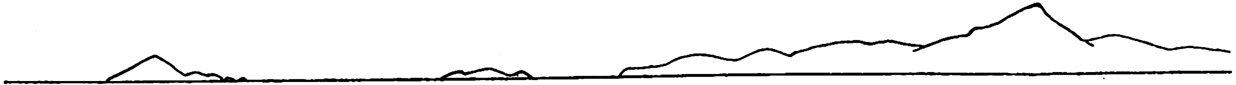
(*Original dated* 1931.)



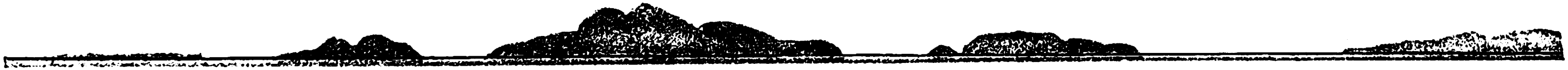
Golf van Boni, northern shore. Tampogeh gebergte from south-eastward,

(*Original dated* 1931.)

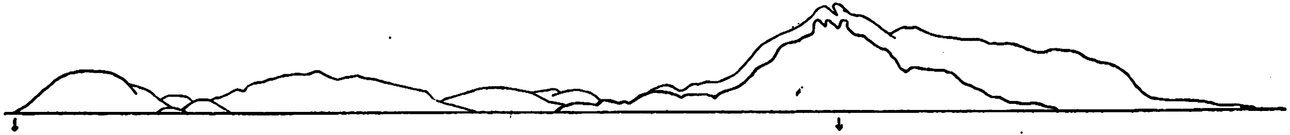
To face page 505.



Golf van Boni, north-eastern part, from a position 5 miles northward of Tanjong Tabako.
(*Original dated* 1931.)



Golf van Boni. Islands in Bingkoka baai.
(*Original dated* 1906.)



Kabaëna from north-westward.
(*Original dated* 1931.)

Chart 3616.

beacon, surmounted by a black cylinder, stands on the northern side of a reef, which dries, southward of the channel. There is a small pier in the river, with a storehouse near its root. The large village of Wotoe is situated about 2 miles up the river.

Baai van Oesoe.—Buoys.—Baai van Oesoe (Usu) lies in the north-eastern corner of the head of Golf van Boni. The northern shore of the bay is separated from the mountains by an alluvial plain, through which Sungei Oesoe (Usu) flows, and the southern shore is high and steep. The saddle-shaped islet Boeloe Poeloe (Bulu Pulu) lies about 4 cables westward of Tanjong Boeloe Poelo (Bulu Pulu), the southern entrance point of the bay, and there is a clear passage between. The mountain on the peninsula within Tanjong Boeloe Poeloe, 1,883 feet (573^{m}9) high, is prominent. *See* view facing this page.

There is anchorage for vessels with local knowledge, in a depth of not less than 11 fathoms (20^{m}1), off the mouth of Sungei Oesoe; with the river in flood and the wind from seaward there is sometimes a very turbulent sea. The roadstead, which is bounded by the arc of a circle drawn with the radius of one mile from a position situated about 5½ miles south-westward of the flagstaff at Malili, is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

The large and important village of Malili, a trading place for forest produce and the residence of a Government official, is situated on Sungei Malili, about 2½ miles above its junction with Sungei Oesoe. A least depth of 10 feet (3^{m}0) could be carried, in 1921, through the outer bar of Sungei Oesoe, and 5 feet (1^{m}5) over the inner bar, at the entrance to Sungei Malili; otherwise there was a least depth of 13 feet (4^{m}0) from the sea to Malili village. A bank of hard sand, with a depth of 3 feet (0^{m}9) over it, lies southward of the mouth of Sungei Oesoe, leaving a channel on either side; the western of these is marked by a conical approach buoy, painted red and black in horizontal bands and surmounted by a ball, and by a white conical buoy. The reef, which dries, lying eastward of the inner bar, consists of mud and sand.

A direct course can be safely steered from Palopo to Reede Oesoe; the drying reefs lying southward of this route are sometimes marked by discoloration when covered.

Coast.—From Tanjong Boeloe Poeloe (*Lat. 2° 48′ S., Long. 120° 59′ E.*) to Tanjong Tabako, the eastern shore of the head of Golf van Boni, is high, and except for the reefs, there is deep water generally till close inshore; as mentioned on page 503, however, this part of the gulf should be avoided. The coast is sparsely populated, and Lelewaoe (Lelewau) village, 13½ miles south-south-eastward of Tanjong Boeloe Poeloe, is the only place of any importance.

EASTERN SIDE OF GOLF VAN BONI.—Coast.—Dangers.—Tanjong Boegingkalo (Bugingkalo), the eastern entrance point of Golf van Boni, is situated about 86 miles north-eastward of Tanjong Lassa (page 484), and is a low, rounded point with some high, scattered trees on it; a detached, reef, which dries, lies about 1¼ miles southward of the point, and a 3-fathom (5^{m}5) patch lies about 1½ miles eastward of this reef; these reefs are fairly well marked by discoloration. A small shoal, with a depth of 3 fathoms (5^{m}5) over it, lies about 4½ miles south-eastward of Tanjong Boegingkalo.

Charts 941b, 942a, 1263, 2759a.

Chart 3616.

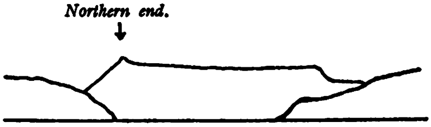
The coast between Tanjong Boegingkalo and the entrance to Paria baai, about 4¾ miles north-westward, is fringed by a wide reef, generally plainly marked by discoloration; there are two basins in this reef, off the villages Baroe (Baru) and Soppeh; the latter stands on the reef, which dries, west-north-westward of the former.

Chart 2674, plan of Paria bay.

Paria baai.—Paria baai affords anchorage for vessels of moderate size, in depths of from 8 to 16 fathoms ($14^{m}6$ to $29^{m}3$); the entrance is about 3 cables wide between the coastal reefs on either side. When entering, the western entrance point of the bay, which is covered with mangroves, should be held closely on a northerly course, bearing in mind that the coastal reef south-westward of this point is dangerous, as it is scarcely marked by discoloration, the water being muddy. Sopang, a hill, 738 feet ($224^{m}9$) high, on the western side of the bay, is not very conspicuous from seaward against the high background.

Chart 3616.

Coast.—The coast between Paria baai and Tanjong Tawari, about 15 miles north-westward, can be approached fairly closely, but it is fringed by a steep-to reef, seldom marked by discoloration; a few patches dry, and these are generally marked by fishing stakes. The villages Boeapinang and Poehara (Puhara), on the coast, about 4 and 6 miles, respectively, west-north-westward of Paria baai, are visible from seaward. Platte heuvel (Flat hill), about 9 miles eastward of Tanjong Lamoeloe (Lamulu), situated about 4½ miles southward of Tanjong Tawari, is of regular elevation for a considerable distance in a north-north-westerly and south-south-easterly direction, and drops rather abruptly at the ends.



Platte heuvel, bearing about 045°.

(*Original dated* 1931.)

Anchorage can be obtained by vessels with local knowledge in the small bight immediately northward of Tanjong Tawari (*Lat. 4° 37′ S., Long. 121° 28′ E.*), in a depth of 20 fathoms ($36^{m}6$), about one cable from the coastal reef and southward of the mouth of Sungei Tawari, with Tanjong Tawari bearing 199°; this anchorage is sheltered from the southerly swell in the South-east monsoon. There is also anchorage for vessels with local knowledge close northward of the mouth of Sungei Tawari, in a depth of 11 fathoms ($20^{m}1$), mud, with Tanjong Tawari bearing 175°, but the bottom is very steep here.

Off-lying reefs.—The following steep-to reefs, marked by discoloration, and, with constant winds, by a heavy surf, lie outside the 100-fathom ($182^{m}9$) line off the coast between Paria baai and Tanjong Lamoeloe:—

Sopang, about 8 miles south-westward of the entrance to Paria baai, is a small, dangerous reef with a depth of 3 feet ($0^{m}9$) over it.

Basa, about 9 miles southward of Tanjong Lamoeloe, has a small, thickly wooded islet, also named Basa, on its northern part.

Charts 941b, 942a, 1263, 2759a.

Chart 3616.

Boisebola, about 2 miles north-westward of Basa, dries in several places.

Lamoeloe (Lamulu), about 3 miles southward of Tanjong Lamoeloe and the same distance offshore, has a white sandbank on its northern part, which dries about 6 feet (1^{m}8) at lowest tides.

Coast.—Dangers.—Beacons.—The coast between Tanjong Tawari and Tanjong Pakar, about 22 miles northward, is hilly and is fringed by a reef, which dries, extending about three-quarters of a mile offshore in the vicinity of Tanjong Tangé Tada, situated about 17 miles northward of Tanjong Tawari, and narrowing off the coast southward and northward. Several reefs lie as much as 3 miles offshore within the 100-fathom (182^{m}9) line; three reefs, which dry, lie within 2 miles of the coast and 4 miles northward of Tanjong Tawari, and on the southernmost of these a small white sandbank plainly shows at low water. The mountains inland have few noticeable features; Tabonto, 3,219 feet (981^{m}2) high, about 23 miles eastward of Tanjong Tangé Tada, is not always visible, and the wooded hill shown on the chart about 14 miles eastward of Tanjong Tawari, is only distinctive when a vessel is northward of this point.

About 3 miles northward of Tanjong Tangé Tada is the mouth of the Kali Oko Oko, which is a loading place for timber; depths of 3 fathoms (5^{m}5), or less, extend about 1¼ miles seaward from the river mouth. Shoals, with depths of 2¼ and 3¼ fathoms (4^{m}1 and 5^{m}9) over them, lie about 2¾ miles west-north-westward and north-north-westward, respectively, of the river mouth. A 1¾-fathom (3^{m}2) patch, marked by a beacon, surmounted by a ball, and a 5-foot (1^{m}5) patch, marked by an unofficial beacon, surmounted by a cone, lie about 7½ and 4 cables, respectively, north-westward of Tanjong Batoe Kilat, situated about 1¾ miles northward of the mouth of Kali Oko Oko.

Bingkoka baai.—Light.—Dangers.—Beacons.—Bingkoka baai is entered between Tanjong Pakar and Tanjong Kanoweha, 19 miles north-westward; the southern part of it is practically inaccessible owing to the numerous reefs. Several islands lie across the entrance; (*see* view facing page 505). Padamarang, the largest of these, is rugged, deeply indented, and has several prominent peaks, the highest of which has an elevation of 2,303 feet (702^{m}0). Lima, an islet, 233 feet (71^{m}0) high, lies on the reef extending half a mile from the south-western extremity of the island; a bare rock lies on the reef extending about half a mile from the south-eastern extremity, and Pulau Idjoe (*Lat. 4° 05′ S., Long. 121° 24′ E.*) lies close off the northern extremity. Lemo is an islet lying about 3½ cables from the north-eastern extremity of Padamarang, leaving a deep but narrow passage between, but, owing to the strong current, it is not advisable to make use of it.

Groot Lambasina, lying about half a mile from the north-western extremity of Padamarang, has two summits, forming a saddle; the passage between this island and Padamarang is almost closed. Klein Lambasina lies about one mile westward of Groot Lambasina, with a safe passage between.

Maniang lies about 2½ miles south-eastward of Padamarang; the islands Laag Kokosan and Hoog Kokosan are connected to the northern side of Maniang by a reef, which dries. Numerous shoals lie between Maniang and the mainland south-eastward.

Padamarang rif, about 1½ miles north-north-westward of the north-

Charts 942a, 1263, 2759a.

Chart 3616.

ern extremity of Padamarang, is a coral reef which dries, and is marked by a black beacon, surmounted by a cone, and equipped with a reflector.

Bingkoka rif, about 6 miles east-north-eastward of the eastern extremity of Padamarang, dries and is marked by a white beacon, surmounted by a ball, on its northern side.

Kolaka rif, about one mile north-eastward of Bingkoka rif, partly dries, and is marked on its southern extremity by a black beacon, surmounted by a cone. A light is occasionally exhibited on this beacon.

Kolaka village, a trading place for forest produce etc., is situated at the north-eastern side of the bay; there is a stone pier here, with a depth of 3 feet ($0^{m}9$) at its head. Vessels of the Koninklijke Paketvaart Maatschappij visit Reede Kolaka regularly.

The roadstead is bounded by the parallel and the meridian of the beacon, situated on Bingkoka rif.

Pomalaä.—Swept channel.—Beacons.—Buoy.—Pomalaä village, also a trading place, is situated about 7½ miles southward of Kolaka; an approach channel has been swept to a depth of not less than 30 feet ($9^{m}1$), from a position about 3 cables southward of Padamarang rif beacon to the anchorage off Pomalaä. There is a pier at Pomalaä.

There is a prominent chimney, 148 feet ($45^{m}1$) in height, about half a mile southward of Pomalaä.

Two beacons, each surmounted by a white ball, standing on the northern edges of small reefs, mark the south-western side of the swept channel; they are situated about 2 miles north-eastward, and about 3¾ miles eastward of the southern extremity of Lemo.

Three beacons, of which each of the two westerly are surmounted by a white ball, and the eastern beacon by a cone, mark reefs on the northern, south-western and eastern sides of the anchorage off Pomalaä, and are situated, respectively, about 2¼ miles north-north-westward, 1½ miles north-westward and about 11 cables north-north-westward of that village.

A black and white chequered conical buoy, surmounted by a ball, marking the northern side of a 23-foot ($7^{m}0$) patch, is moored about 3¼ miles north-north-westward of Pomalaä.

Anchorages.—Directions.—Anchorage may be obtained by vessels with local knowledge, in a depth of 16 fathoms ($29^{m}3$), about half a mile south-westward of the head of the pier at Kolaka.

There is anchorage for vessels with local knowledge off Pomalaä.

Vessels with local knowledge can obtain good anchorage, in depths of from 11 to 13 fathoms ($20^{m}1$ to $23^{m}8$), about 2¾ cables eastward of Tanjong Kajoe (Kayu) Angin (*Lat. 4° 01′ S., Long. 121° 27′ E.*), situated on the northern side of Bingkoka baai about 8½ miles west-north-westward of Kolaka. Likoe baai lies immediately north-eastward of Tanjong Kajoe Angin, but, owing to the numerous reefs, it is dangerous to enter.

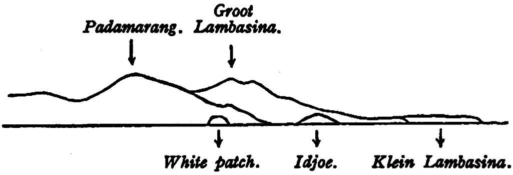
A vessel approaching Bingkoka baai from westward should steer for the summit of Padamarang, bearing 090°, so as to pass well clear southward of Rosa Marie reef (page 510). A vessel from southward can steer for the summit of Padamarang, bearing 000°, and, passing westward of this island, should then proceed through the channel between Groot Lambasina and Klein Lambasina. From northward

Charts 942a, 1263, 2759a.

Chart 3616.

a vessel can approach the coast in the vicinity of Tanjong Lariko, situated about 14 miles north-westward of Tanjong Kanoweha, and pass close off the entrances to Lariko baai and Pau Pau baai (page 510).

To enter Bingkoka baai, from any direction, a vessel should pass southward of the beacon on Padamarang rif, and then bring the south-eastern summit of Groot Lambasina in line with a sharp hillock near the northern extremity of Padamarang, bearing 262°, astern, which leads between Bingkoka and Kolaka riffen to the anchorage off Kolaka.


Padamarang.
Groot Lambasina.
White patch.
Idjoe.
Klein Lambasina.

S.E. summit of Groot Lambasina in line with a sharp hillock on Padamarang, bearing 262°.

(*Original dated* 1937.)

If proceeding to Pomalaä the vessel should keep on the alignment of 262°, given above, until the north-eastern extremity of Padamarang bears 200°, when she should alter course to about 119° to pass north-eastward of the black and white chequered buoy, passing about half a mile north-eastward of the two beacons north-eastward and eastward of Lemo. On rounding the buoy, she should steer to pass about 3 cables eastward of the beacon situated about 2¼ miles north-north-westward of Pomalaä, and then midway between the two beacons southward, anchoring as convenient. The swept channel terminates between these two beacons.

A vessel bound for the anchorage eastward of Tanjong Kajoe Angin from Golf van Boni, after passing southward of Padamarang rif, should bring the south-eastern extremity of Groot Lambasina in line astern with the north-western extremity of Pulau Idjoe, bearing 240°; when the prominent point, with high casuarina trees on it, on the western side of Likoe baai, is in line with a prominent crest in the hills in the foreground, bearing 333°, she should alter course on to this alignment, which leads clear of the reefs south-eastward of Tanjong Kajoe Angin (*Lat. 4° 01′ S., Long. 121° 27′ E.*); when Tanjong Kajoe Angin is in line with Tanjong Kanoweha, bearing about 287°, she should alter course on to this alignment, which will lead to the anchorage.

Tidal streams.—The tidal streams set irregularly between the reefs. Northward of the islands they set generally eastward and westward; a south-going stream has been observed eastward of the islands and between Maniang and the coast.

Coast.—The coast between Tanjong Kanoweha and Tanjong Tabako, about 45 miles north-westward, is sparsely populated and of little importance to shipping; this coast is generally high, with mountains rising steeply a short distance inland. Numerous reefs lie just within the 100-fathom ($182^{m}9$) line, thereby rendering the approach to the coast difficult; they are marked by discoloration but are difficult to distinguish at a distance; the positions of these reefs can best be seen on the chart.

Charts 942a, 1263, 2759a.

Chart 3616.

Pau Pau baai, entered between Tanjong Tamboli, situated about 3¾ miles north-westward of Tanjong Kanoweha, and Tanjong Doengi (Dungi), about the same distance farther west-north-westward, affords anchorage for vessels with local knowledge on its eastern side. A steep-to coastal reef extends about 4 cables from the eastern shore, and a reef, with a depth of one foot ($0^{m}3$) over it, lies about 4 cables off the north-western shore. Tanjong Doengi can be rounded closely.

Lariko baai is entered between Tanjong Waminda, situated about 3¼ miles north-north-westward of Tanjong Doengi, and Tanjong Lariko, about 4 miles north-westward. Laboeroko, an islet, 394 feet ($120^{m}1$) high, lies half a mile westward of Tanjong Waminda. The best anchorage, for vessels with local knowledge, is in the southern part of the bay, in a depth of about 20 fathoms ($36^{m}6$).

Chart 3470, plan of Labuandata bay.

Baai van Laboeandata (Labuandata), entered about 8 miles southward of Tanjong Tabako, affords good anchorage, in a depth of 20 fathoms ($36^{m}6$), but there is only sufficient space for one vessel.

Chart 3616.

Outlying reefs.—Rosa Marie reef, about 12 miles south-south-westward of Tanjong Doengi, has a depth of only a few feet over it and breaks heavily.

Tamboli reef lies about 10 miles south-westward of Tanjong Doengi and dries.

Dungi reefs are two small reefs just within the 100-fathom ($182^{m}9$) line ; the north-western, with a depth of 5 feet ($1^{m}5$) over it, lies about 8½ miles westward of Tanjong Doengi ; the south-eastern has a depth of one foot ($0^{m}3$) over it. A reef, which dries, lies about 5¾ miles north-westward of the north-western Dungi reef.

WESTERN APPROACH TO STRAAT TIORO.—The western approach to Straat Tioro is bounded on the north by the south coast of Celebes between Tanjong Boegingkalo (page 505) and Tanjong Peloeri, 18½ miles eastward, and on the south by the north coast of the island Kabaëna. The approach is clear, except for a reef of sand and stones, with a least depth of 5½ fathoms ($10^{m}1$) over it, in about the middle. The tidal streams set eastward and westward, the rate seldom exceeding 1½ knots.

Northern shore.—The Celebes coast, forming the northern shore of the western approach to Straat Tioro, forms a wide bight eastward of Tanjong Boegingkalo ; Tanjong Batoe (Batu) lies about 6 miles eastward of Tanjong Boegingkalo (*Lat. 4° 51′ S., Long. 121° 42′ E.*). The depths in this bight are irregular, and a reef, with a depth of 2¼ fathoms ($4^{m}1$) over it, lies about 2 miles southward of Tanjong Batoe. Between Tanjong Batoe and Tanjong Peloeri the hills approach the coast ; Roembia (Rumbia) gebergte, about 5 miles inland, has no conspicuous peaks.

Pasoedoe (Pasudu) is an islet on a reef lying about 2 miles west-south-westward of Tanjong Peloeri, and can be identified from a great distance by a large tree projecting above the shrubs which cover the islet ; there is a channel, clear of dangers, with depths of 6 fathoms ($11^{m}0$), between the reef fringing the islet and the reef extending 1¼ miles from the Celebes coast. The roadstead of Lemmoe (Lemmu) lies northward of Pasoedoe.

Charts 942a, 1263, 2759a.

Chart 3616.

Kabaëna.—Kabaëna is a mountainous island with a peak 5,085 feet (1,549^{m}9) high, named Sabanpololoe (Sabanpololu), in about the middle; from westward it shows a round summit with a cleft, but appears conical from southward. Batu Sengia, 3,740 feet (1,140^{m}0) high, about 6 miles north-westward of Sabanpololoe, has five peaks, but only two or three of these are visible. The north-western part of the island is low. *See* view facing page 505.

North and west coasts of Kabaëna.—Anchorages.—Pising baai, on the north coast of Kabaëna, affords sheltered anchorage for vessels with local knowledge, but the western part is foul. Tanjong Batoe (Batu) Mongiwa is the eastern entrance point of this bay.

The northern part of the west coast of Kabaëna is low, and is fronted by a reef, which dries, extending from about half a mile to 1¾ miles offshore, through which are four narrow channels, giving access to sheltered, but restricted anchorages; the width of these channels varies from a half to three-quarters of a cable, and at low water they are easy to navigate, as the edges of the reefs on either side show plainly. The southern part of the west coast is steep.

Geul van Balandai, the northernmost of the above channels, is entered about 3¾ miles south-westward of the northern extremity of Kabaëna, and is slightly winding, with depths of about 3 fathoms (5^{m}5); it leads to Baai van Balandai, which affords anchorage to vessels with local knowledge, in a depth of 2¼ fathoms (4^{m}1). Balandai village, with a noticeable mosque, is situated on the reef on the northern side of the entrance to the bay.

Geul van Lawotto runs northward of Lawotto, a low island covered with high trees lying close offshore about 5 miles south-south-westward of the northern extremity of Kabaëna; this island does not show plainly against the background, but Bangko, a low islet lying on the coastal reef, which dries, off the west coast of Lawotto, is easily identified. Geul van Lawotto gives access to Baai van Lawotto, where anchorage can be obtained by vessels with local knowledge, in depths of from 5 to 7 fathoms (9^{m}1 to 12^{m}8), the entrance channel being deeper.

Geul van Baleara is entered about 3 miles south-westward of Geul van Lawotto, and is short and straight, with a least depth of 11 fathoms (20^{m}1); it leads to a wide basin, with depths of nearly 4 fathoms (7^{m}3), southward of Pulau Lawotto. Baleara village is situated on Pulau Baleara (*Lat. 5° 10′ S., Long. 121° 49′ E.*), which lies on the south-western side of the basin; there is good anchorage here for vessels with local knowledge, but care should be taken to avoid a detached reef, which dries, and two rocks in the basin.

Geul van Talinga, the southernmost of the four, is entered about 2½ miles south-westward of Pulau Lawotto, and leads to a basin, encumbered with reefs, south-eastward of Talinga, an islet on the reef forming the northern side of the channel. The depths in Geul van Talinga vary between 3¼ and 5 fathoms (5^{m}9 and 9^{m}1); the entrance is narrower and more winding than the other three channels.

Mataha, a low flat island, lies near the southern end of the reef extending from the northern half of the west coast of Kabaëna and 1¼ miles westward of Tanjong Malaté, the western extremity of Kabaëna. A channel, with a least width of about half a mile, and a least depth of 3¼ fathoms (5^{m}9) in the fairway, extends about 3 miles north-north-eastward between Mataha and Tanjong Malaté.

Charts 942a, 1263, 2759a.

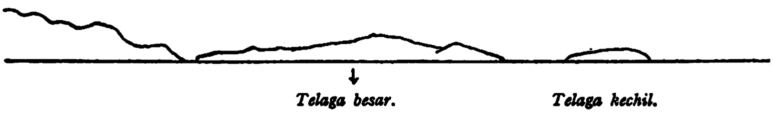
Chart 3616.

Reede Mataha.—Beacon.—Buoy.—From Matahà a barrier reef runs within a distance of from one to 2 miles of the coast to Tanjong Kokoi, the southern extremity of Kabaëna. Nearly 4 miles south-south-eastward of Tanjong Malaté there is a passage through the barrier for vessels with local knowledge, giving access to Reede Mataha. The reef on the south-eastern side of the passage is marked by a white conical buoy, and a reef, with a depth of 1¼ fathoms (2^m^3) over it, about 2¼ miles south-south-eastward of Tanjong Malaté, is marked by a white beacon, surmounted by a ball. Katoewa village stands about 6 cables south-eastward of Tanjong Malaté.

Off-lying islands and dangers.—Sogori is a large atoll-reef lying outside the 100-fathom ($182^{m}9$) line, with its northern end about 3½ miles southward of Mataha; a great part of the reef dries, and a portion at the northern end is always above water. The basin enclosed by the reef can be safely entered through a passage on the eastern side, where there is a depth of 3¼ fathoms ($5^{m}9$); the reef is marked by a clear green discoloration.

Chart 3470, plan of channel between Kabaëna and Telaga islands.

Telaga besar and Telaga kechil lie about 1½ miles off the south coast of Kabaëna, and are separated from it by a channel clear of dangers in the fairway, with depths of from 6½ to 14 fathoms ($11^{m}9$ to $25^{m}6$) in the fairway; the coastal reef extends about 6 cables from Tanjong Kokoi, and the three islets Djere (Jere), Wali, and Kokoi lie on its western edge. Telaga besar is low at the south-western end, but rises to a plateau, 486 feet ($148^{m}1$) high, in the north-eastern part; a rock, which dries, lies about 6 cables westward of the northern extremity of the island and 3 cables offshore. Telaga kechil has a small village on the western side. There is anchorage off the north coast of Telaga kechil, in a depth of about 27 fathoms ($49^{m}3$), with the north-eastern extremity of Telaga besar in line with the north-western extremity of Telaga kechil, bearing about 210°; this anchorage is sheltered from winds between south-east and south-west, through south. Passi Woeloe (Wulu), a reef, which dries, lies about 2 miles northward of the north-western extremity of Telaga kechil (*Lat. 5° 29′ S., Long. 122° 05′ E.*) and 1¼ miles off the south-eastern side of Kabaëna.


Telaga besar.
Telaga kechil.

Telaga besar bearing 045°, distant 15 miles.

(*Original dated* 1931.)

Chart 3616.

SOUTHERN APPROACH TO STRAAT TIORO.—The southern approach to Straat Tioro lies between the east coast of Kabaëna and the southern part of the west coast of Moena (Muna), an island 13 miles eastward; this passage is entered from southward between Telaga kechil and Tanjong Weta, the south-western extremity of Moena, situated about 12 miles north-eastward. The eastern half of the northern part of the passage is too encumbered with reefs and shoals to be navigable except with local knowledge; the fairway here lies close

Charts 942a, 1263, 2759a.

Chart 3616.

eastward of the beacon on Passi Pandolangi, situated about 5 miles east-south-eastward of Tanjong Batoe Mongiwa. The tidal streams set northward during rising water and southward during falling water through the passage, the rate seldom exceeding 2 knots.

Damalawa kechil lies about 9 miles northward of Telaga kechil, and is separated from the reef extending from the east coast of Kabaëna by a narrow channel, with depths of 4¼ fathoms ($7^{m}8$), but a detached reef, which dries, lies on the western side of the southern entrance; the small village Donggala is situated on the Kabaëna shore of this channel, and anchorage can be obtained by vessels with local knowledge, in a depth of about 6½ fathoms ($11^{m}9$), about 1¾ cables eastward of the root of a boat pier here and about 1½ cables from the coastal reef. Damalawa besar is an island, 951 feet ($289^{m}9$) high, lying 7 cables north-north-eastward of Damalawa kechil, and is separated from Kabaëna by a channel, with a depth of 2¾ fathoms ($5^{m}0$), available for small vessels with local knowledge, but care should be taken to avoid a 1½-fathom ($2^{m}7$) patch lying in the middle of the southern entrance. Telok Tallabassi, entered between Damalawa besar and Tanjong Tallabassi, a steep point about 3 miles northward, affords anchorage to vessels with local knowledge in the south-western part, in a depth of 9 fathoms ($16^{m}5$), off the north-west coast of Damalawa besar. Dahoe Dahoe (Dahu Dahu) is a small islet lying about 4 cables northward of Tanjong Tallabassi, and is separated from the Kabaëna coast by a channel about 1½ cables wide, on the western side of which there is a 2¾-fathom ($5^{m}0$) patch. Lingora baai, situated immediately northward of Tanjong Lingora, about 5½ miles north-north-westward of Tanjong Tallabassi, is clear of dangers in the southern part outside the 10-fathom ($18^{m}3$) line, but a few reefs lie in the northern part.

The west coast of Moena between Tanjong Weta and Tanjong Tattapi, about 17 miles northward, is almost entirely covered with mangroves and presents no distinctive features; numerous shoals and reefs, which dry, subject to change in shape and position, lie within a distance of 2½ miles of this coast.

Dangers.—Beacon.—Several reefs lie off the east coast of Kabaëna between Passi Woeloe (page 512) and Damalawa kechil; of these Passi Gamma, Passi Boeri (Buri), and Passi Iti lie within a distance of 3 miles of the coast and outside the 20-fathom ($36^{m}6$) line, and all three dry. Passi Tomba, with a depth of one fathom ($1^{m}8$) over it, lies one mile south-south-eastward of Damalawa kechil and about 1¼ miles offshore; a 3-foot ($0^{m}9$) patch lies about three-quarters of a mile eastward of the southern extremity of this islet. A reef, with a depth of 3 feet ($0^{m}9$) over it, lies about 9 cables south-eastward of Tanjong Tallabassi.

Passi Pandolangi, about 4 miles northward of Tanjong Lingora (*Lat. 5° 09′ S., Long. 122° 02′ E.*), is a sandbank with some rocks, which dry, on it; when covered it is only occasionally marked by discoloration. A black beacon, surmounted by a cone, stands on the south-eastern edge of this reef.

Wassollangka baai.—Dangers.—Beacons.—Wassollangka baai, into which Kali Wassollangka discharges, lies on the western side of Moena, and is entered between Tanjong Tattapi and Tanjong Kabitte bitte, about 5 miles north-eastward. Batu Adjarra, a reef which dries, extends about 2½ miles north-north-westward from Tanjong

Charts 942a, 1263, 2759a.

Chart 3616.

Tattapi, and is marked at its north-western extremity by an unofficial beacon, surmounted by a cone, and at its north-eastern extremity by an unofficial beacon, surmounted by a cross. A white beacon, surmounted by a ball, marks the edge of the 3-fathom (5^m5) line, about 4 cables north-westward of the north-western edge of the reef. A detached reef lies about midway between the northern extremity of Batu Adjarra and Tanjong Kabitte bitte, and its southern edge is marked by two non-official beacons. A black beacon, surmounted by a cone, stands on the southern extremity of a reef about 6½ miles westward of Tanjong Tattapi.

The bar off the entrance to Wassolangka has a depth of 2 feet (0^m6) over it; Wassolangka village is situated about 2½ miles above the mouth. There is anchorage for vessels with local knowledge, in a depth of about 3¾ fathoms (6^m9), about half a mile westward of the detached reef in the middle of the entrance to Wassolangka baai; this anchorage is approached by steering a north-easterly course to pass south-eastward of the black beacon on the reef about 6½ miles westward of Tanjong Tattapi, and north-westward of the official white beacon off Batu Adjarra.

Charts 2196, 3616.

STRAAT TIORO.—Straat Tioro, between the north-western side of Moena and the Celebes coast, is much encumbered by islands, reefs, and rocks, with some clear passages between, extending about 11 miles north-north-westward from Tanjong Tioro, situated on the Moena shore about 22 miles northward of Tanjong Tattapi; the reefs and rocks are generally plainly marked by discoloration, but they are so steep-to that sounding gives no warning.

The navigable channel in the southern entrance to the strait is greatly reduced in width by the numerous reefs which extend to a distance of 17 miles from the Moena coast between Tanjong Tattapi and Tanjong Mapanti, 16 miles northward. The eastern entrance of the strait is divided into two narrow channels by Groot Tobea, an island lying on a reef in mid-channel.

All the islands in Straat Tioro are low, except Groot Tobea, which has some low hills on it, and most of the islands in the south-western entrance; many of them are inhabited and planted with coconut trees, but some of them are little more than mudbanks covered with mangroves. Fishing is carried out to a great extent by the natives, bundles of bamboo and reeds being used for this purpose in the deep parts of the strait.

Little is known of the tidal streams in Straat Tioro, except that they set westward and southward or northward and eastward; in Laea baai, on the Celebes coast just within the eastern entrance, and in the passages on either side of Groot Tobea (*Lat. 4° 33′ S., Long. 122° 43′ E.*), there is sometimes a tidal stream for 24 hours in one direction. The rate seldom exceeds 2 knots except in a few narrow passages.

During the west monsoon winds between south-west and north-west blow fairly regularly in the afternoon, abating again in the evening. During squalls the force of the wind sometimes reaches 8 (Beaufort scale).

The Celebes coast at the south-western entrance to Straat Tioro is rocky between Tanjong Peloeri and Tanjong Batoe (Batu) Simpe,

Charts 2196, 3616.

about 9½ miles north-eastward, and there is another rocky part at Toeroeboeloe (Turubulu) baai, about 30 miles farther north-eastward; elsewhere the whole of this side of the strait is covered with mangroves, through which numerous rivers flow with shallow deltas. Numerous reefs lie off the Celebes coast between Laboean Manoesoer (Labuan Manusur), a village 19½ miles northward of Tanjong Batoe Simpe, and Toeroeboeloe baai; these are generally plainly marked by discoloration, except a small 3-foot ($0^{m}9$) patch lying about 3¾ miles southward of this village.

The mouth of the river in which Lakara is situated, 9½ miles east-north-eastward of Laboean Manoesoer, may be identified by a low islet lying on the coastal bank, south-westward of the mouth.

The most conspicuous landmarks on the Celebes side of the strait are Tompa Batoe (Batu), a peak 1,906 feet ($580^{m}9$) high, 10½ miles north-westward of Tanjong Batoe Simpe, and an isolated hill, 850 feet ($259^{m}1$) high, about 3½ miles north-westward of the western entrance point of Toeroeboeloe baai.

A shoal, which dries, lies about 3¾ cables offshore, in the north-eastern part of Laea baai, about 6½ miles north-westward of Tanjong Polawali, the south-eastern entrance point of the bay.

The Moena coast, forming the southern side of Straat Tioro, is almost entirely covered with mangroves and is practically uninhabited. Owing to numerous reefs, that part of the coast between Tanjong Tioro and Tanjong Bakoekoe (Bakuku), about 15 miles north-eastward, should not be approached.

Chart 3470, plan of Tambako island and channel.

Anchorage.—Tambako, an island about 3¼ miles eastward of Tanjong Peloeri, is separated from the Celebes coast by a clear channel with a least depth of 4¾ fathoms ($8^{m}7$) in the fairway, and good anchorage can be obtained in this channel. There is a large village on the western side of the island, and there is a collecting place for forest produce, with a small wooden pier, on the northern side. There is a boat pier, reached through an inlet in the coastal reef, at Laora village, a collecting place for forest produce situated on the Celebes coast about one mile northward of the northern extremity of Tambako. Kambing is an islet lying on the reef which extends about 3½ cables eastward from the eastern extremity of Tambako.

Batu Mandi, a rock, 16 feet ($4^{m}9$) high, lies about one mile south-eastward of Tambako; a reef, with a depth of one fathom ($1^{m}8$) over it, lies about one mile westward of Batu Mandi, and a reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies about 3 cables northward of Batu Mandi.

Charts 2196, 3616.

Directions for Straat Tioro.—Beacons.—No vessel without local knowledge should proceed through Straat Tioro. A vessel bound through the strait from westward should steer to pass between Tambako and a reef lying about 3½ miles southward, marked by a black beacon, surmounted by a cone, on its south-western extremity; then she should alter course north-eastward, so as to pass fairly close south-eastward of Batu Mandi (*Lat. 4° 54′ S., Long. 122° 04′ E.*), and thence between the islands Mangatah and Magenti, which lie 2 miles south-eastward and 4 miles eastward, respectively, of Tanjong Batoe Simpe. The usual route then lies westward of a white beacon, surmounted by a ball, marking a reef about 13 miles north-eastward of Tanjong Batoe Simpe,

Charts 942a, 1263, 2759a.

Charts 2196, 3616.

and thence between Bero Masidi, an island nearly 18 miles north-eastward of Tanjong Batoe Simpe, and a reef lying about 2½ miles west-north-westward of this island, marked by a black beacon, surmounted by a cone, on its south-western extremity. Bero Masidi and Bero Matenga, about one mile eastward, are both inhabited; there is a small wooden pier on the eastern side of the former, and a stone pier for boats on the southern side of the latter. The route lies northward of these two islands, and the vessel may then steer for the eastern entrance of the strait, taking care to avoid a reef lying about 4 miles eastward of the northern extremity of Bero Matenga. The vessel can pass either northward or southward of Groot Tobea; if taking the northern channel she should keep nearer the Celebes shore; if taking the southern channel, she should pass between Klein Tobea, lying about half a mile off the south-western side of Groot Tobea, and a large reef, which dries, lying off the Moena shore, about 2 miles south-westward; the north-eastern side of this reef is marked by a white beacon, surmounted by a ball.

There are also deep passages between the islands lying in the middle part of the strait northward of Bangko Malampe, a large island about 5½ miles south-south-eastward of Bero Matenga; provided the reefs are clearly visible, and due caution is exercised, these passages may be used. In addition to the official beaconage mentioned in the directions just given, there are several non-official beacons on both sides of Straat Tioro.

Chart 3616.

SOUTHERN APPROACH TO STRAAT BOETON.—South coast of Moena.—The south coast of Moena is indented by three bays; Wambololi baai, the western of these, terminates in a shallow creek trending eastward; there is a deep basin at the entrance to this bay, but elsewhere it is too encumbered by steep-to coral banks to be used except by small vessels with local knowledge.

Chart 2196.

Lasongko baai, the middle of the three bays, is entered between Tanjong Inoeloe (Inulu), situated about 12 miles eastward of Tanjong Weta (page 512), and Tanjong Wandoridi, about 4 miles east-south-eastward. It is obstructed in its entrance by a reef, on which there are rocks, with depths of from 2¾ to 3¾ fathoms ($5^{m}0$ to $6^{m}9$) over them; inside the bay there are depths of from 10 to 12 fathoms ($18^{m}3$ to $21^{m}9$) in the fairway extending nearly 5 miles towards the head. Kaoento (Kaunto), a rock covered with vegetation, lying on the coastal reef on the western side of the bay, about 4 miles north-north-eastward of Tanjong Inoeloe (*Lat. 5° 24′ S., Long. 122° 28′ E.*), and two smaller rocks, about 4½ cables northward of it, afford good marks for entering. To obtain the greatest depths over the barrier reef, the eastern of the two smaller rocks should be kept in line with the western side of Kaoento, bearing 004°; this mark, however, leads very close eastward of a 2¾-fathom ($5^{m}0$) patch on the reef in the entrance, and it is preferable to enter with the western of the two smaller rocks showing between Kaoento and the western shore of the bay; the eastern rock will then be shut in behind Kaoento.

Nambo baai, the eastern of the three bays, is entered between Tanjong Karoewapoena (Karuwapuna), about 1½ miles eastward of

Charts 942a, 1263, 2759a.

Chart 2196.

Tanjong Wandoridi, and Tanjong Pangela, about 2¾ miles farther eastward, and affords good anchorage.

Straat Massiri.—Dangers.—Anchorages.—Straat Massiri separates the south-western side of Boeton from the islands Sioempoe (Siumpu), Lewoeto (Lewuto) Kidi, and Kadatoea (Kadatua).

Straat Massiri is clear except for a very dangerous small coral reef, named Passina Labanaboengi, with a depth of only about one foot (0^{m}3) over it, lying in the middle of the northern entrance and about three-quarters of a mile eastward of the north-eastern extremity of Kadatoea; it is generally plainly marked by discoloration.

There is a deep channel clear of dangers between Kadatoea, the northernmost of the three islands, and the south coast of Moena.

Sioempoe, the southernmost island, has a flat summit, 951 feet (289^{m}9) high, on the eastern part, from which a long spur trends westward, terminating in a hill on Tanjong Massiga, the south-western extremity of the island; Popalia, a group of rocks partly above water, lies near the outer end of the reef extending from this point. Passina Tongali, a reef with a depth of 2½ fathoms (4^{m}6) over it, lies about one mile south-westward of Tanjong Tolando, the north-western extremity of the island, and is barely marked by discoloration. There is anchorage, in a depth of 24 fathoms (43^{m}9), off Tanjong Tolando.

Lewoeto Kidi, about 1½ miles northward of Sioempoe, has a small hill in the middle; the north-eastern part is low and covered with grass and a few trees.

Kadatoea, about 1¾ miles northward of Lewoeto Kidi, is fairly low. Anchorage can be obtained off the west coast of this island, in depths of from 22 to 25 fathoms (40^{m}2 to 45^{m}7), westward of the northern of two detached rocks on the coastal reef; there is also anchorage off the east coast, in a depth of 7 fathoms (12^{m}8), one mile southward of the north-eastern extremity of the island.

On the eastern side of the strait, between Tanjong Massiri, situated 3½ miles north-westward of Tanjong Lianawonti, the south-western extremity of Boeton, and Tanjong Kalangana, about 5½ miles farther north-north-westward, there is a sloping sandy bottom affording good anchorage for vessels with local knowledge. During the east monsoon there is also anchorage, in a depth of 7 fathoms (12^{m}8), on the coastal bank off Bola village, about 2 miles south-south-eastward of Tanjong Massiri (*Lat. 5° 39′ S., Long. 122° 37′ E.*).

In Straat Massiri the tidal stream sets northward during rising water, and southward during falling water; the period of slack water is of very short duration.

Charts 3470, plans of North Narrows and South Narrows, 2196.

STRAAT BOETON.—Straat Boeton (Buton), between Moena and Boeton, is easy to navigate by day, and is the usual coastal route taken by vessels proceeding to and from Straat Saleier. The land on both sides is high and heavily timbered. The depths are very irregular; in Zuidernauw (South Narrows) they vary from 10 to 54 fathoms (18^{m}3 to 98^{m}8); in the deep basin between Zuidernauw and Noordernauw (North Narrows) there are depths of over 200 fathoms (365^{m}8); and over the northern part, from 20 to 50 fathoms (36^{m}6 to 91^{m}4). A part of the south-eastern end of Celebes forms the western side of the northern end of Straat Boeton.

Charts 3616, 942a, 1263, 2759a.

Charts 3470, plans of North Narrows and South Narrows, 2196.

The following summits on Moena are noticeable. Kasteel berg (*Lat. 5° 20′ S., Long. 122° 34′ E.*), on the eastern side of Lasongko baai, plainly visible from northward or southward; Drie heuvels, abreast Noordernauw; Kasteel heuvel, about 4 miles northward of Drie heuvels; and Lohia, a hill, about 1¾ miles north-westward of Kasteel heuvel.

The following are noticeable on Boeton: Bombo, about 27 miles north-north-eastward of Tanjong Lianawonti, the southern extremity of a high ridge only clearly seen from northward; a wooded hill, 607 feet (185^{m}0) high, 5 miles north-north-westward of Bombo, very noticeable owing to its green grassy slopes and wooded top; Lambolo, about 12 miles northward of Bombo. Tallo, about 5½ miles north-north-eastward of Lambolo, and Klok berg, 2½ miles farther north-north-eastward, are very prominent; when seen from north-westward they are both spherical in shape, with somewhat flat summits, and there is a small cupola-shaped hillock, with fairly steep sides when seen from a north-westerly direction, on the saddle between these two mountains. Pora Pora heuvel, 6 miles northward of Klok berg, does not stand out very clearly against the high background. The summits in the northern part of Boeton are not very clearly defined.

Chart 2196.

On Celebes are Tawa Tawaro, on the western side of the northern entrance to Straat Boeton, and 11½ miles westward of Tanjong Boeton (Buton), the northern extremity of Boeton eiland, and a prominent peak, 1,112 feet (338^{m}9) high, on Tikola peninsula and nearly 10 miles south-westward of Tawa Tawaro; Kolono, about 6 miles westward of Tawa Tawaro, is noticeable from southward.

Local winds and weather.—In the South-east monsoon from June to September, it generally blows from south-east, with more or less force, after 1000, and becomes lighter after about 1600; in some parts of the strait, where the land is high on the Boeton side, particularly in Zuidernauw, very violent squalls occur. In June, July, and August, storms and rain are said to be sometimes experienced; in these months the air is clearer than usual, but in September the wind falls light, with a dense haze over the whole strait. In September and October there is sometimes rain and squally weather over the northern part, but fine at the same time in the south; the wind then blowing between north-east and south-east, occasionally extending to north and south. During the North-west monsoon the winds vary between west and north, but there is little rain.

Over a period of about 3 years' observations, the average wind direction during January and February was found to be 005°, and from July to September, inclusive, 193°.

Tidal streams.—In both entrances the tidal stream sets into the strait while the water is rising, and sets out while the water is falling; there is practically no period of slack water. Owing to the strong tidal streams striking the shores, whirlpools and eddies are found throughout Zuidernauw, and great care should be taken when passing through; the tidal stream here sets somewhat towards the Moena shore. The rate of the tidal stream in the wider part of the strait is from one to 3 knots; the maximum rate, 5 knots at spring tides, occurs in Zuidernauw.

Charts 3616, 942a, 1263, 2759a.

Chart 3470, plan of South Narrows.

Southern entrance to Straat Boeton.—The southern entrance to Straat Boeton lies between Tanjong Pangela (*Lat. 5° 26′ S., Long. 122° 36′ E.*) and Tanjong Kauboela (Kaubula), 1¼ miles southward. Both these entrance points are steep, but even on clear nights they do not show up well against the background; a bank, with depths of less than 5 fathoms ($9^{m}1$) over it, extends about 4 cables southward from Tanjong Pangela. Within the entrance points the strait widens out to a large basin, in which Pulau Makasser lies; the southern half of this island is thickly wooded, and it is thus a distinctive feature when seen from outside the entrance; a bank, with depths of less than 5 fathoms ($9^{m}1$) over it, extends about 4½ cables south-westward from its southern extremity. A bank, with depths of less than 6 fathoms ($11^{m}0$) over it, extends about half a mile from the western shore of the basin between Tanjong Wamingkoli, situated three-quarters of a mile north-eastward of Tanjong Pangela, and Tanjong Baroe Baroe (Baru Baru) Koma, nearly 1½ miles northward. The northern entrance to the basin lies between the latter point and Tanjong Papremkama, about one mile eastward. About 2 miles northward of these two points, on the Moena coast, is the entrance to Baai van Kalandria, which is free from dangers except for a reef, with depths of less than 3 fathoms ($5^{m}5$) over it, extending about 3½ cables south-south-westward from Tanjong Kalandria, the low, wooded, eastern entrance point of the bay. The shores of Baai van Kalandria, and of the basin southward of it, are rather low, with hilly land within.

Swept channel.—A channel, 5 cables wide, has been swept in Zuidernauw.

Reede Boeton.—**Light.**—Reede Boeton (Buton) is bounded by the meridian of the southern extremity of Makasser, and by lines drawn from Tanjong Pangela to that extremity, and to Tanjong Batoe Boeti (Batu Buti) (chart 2196), situated about 2 miles south-westward of Tanjong Kauboela.

Boeton (Buton) village, a military settlement and the headquarters of a Government official, is situated at the mouth of a small river about half a mile eastward of Tanjong Kauboela. A stone breakwater is built over the coastal reef, and there are several small piers, including one where vessels of light draught can lie alongside. There are several mooring buoys off this pier.

A light is exhibited from a post, 10 feet ($3^{m}0$) in height, at the head of the landing pier, where there is a depth of 8 feet ($2^{m}4$) alongside.

There is a prominent white mosque with a flagstaff situated about 1¼ miles south-south-westward of the landing pier.

The bank fringing the coast off Boeton village was reported, in 1948, to be extending.

There is very good anchorage, even with westerly winds, eastward of the mouth of the river, in depths of from 7 to 23 fathoms ($12^{m}8$ to $42^{m}1$); owing to the variable nature of the tidal streams, precautions should be taken to prevent vessels swinging against each other. In the outer part of the roadstead the tidal streams set in the direction of the strait, but close inshore there is an eddy setting almost parallel with the shore, and between these there is a strip of irregular tidal streams.

Reede Boeton is visited regularly by vessels of the Koninklijke

Charts 2196, 3616, 942a, 1263, 2759a.

Chart 3470, plan of South Narrows.

Paketvaart Maatschappij. The village is connected to the district telephone system. Provisions are obtainable.

Zuidernauw.—Zuidernauw (South Narrows) are entered between Tanjong Papremkama (*Lat. 5° 24′ S., Long. 122° 37′ E.*) and Tanjong Kalandria. Tanjong Baroetoe (Barutu), about 1½ miles north-eastward of Tanjong Kalandria, and on the western side of Zuidernauw, is a low, wooded point. Lambako village, 4 cables north-north-eastward of Tanjong Baroetoe, is situated on a plateau rising steeply from the sea; the coast between this village and Tanjong Kemba (chart 2196), about 5 miles northward, is very high and steep.

The eastern shore of Zuidernauw, between Tanjong Papremkama and Tanjong Kalankangan, about 4½ miles north-north-eastward, is high and steep. Batu Sori, an islet composed of yellow sandstone, lies close southward of Tanjong Batoe (Batu) Sori, a point 7 cables southward of Tanjong Kalankangan; Batu Kapal, a steep islet, with a flagstaff on it, lies close off the latter point.

Chart 2196.

Basin between Zuidernauw and Noordernauw.—The western shore, between Tanjong Kemba and Tanjong Leibora, 19 miles north-north-eastward, is high and steep. Baai van Kemba is entered between Tanjong Kemba and Tanjong Mata Ajer (Ayer), 4 miles northward; about 4¾ miles north-north-westward of the latter is a conspicuous wooded hill, well defined against the bare land behind.

The eastern shore is fairly low between Batu Kapal and Tanjong Oemboeloe Soean (Umbulu Suan), about 11 miles north-north-eastward, but northward of the latter point it becomes high and steep again; the low islands Pegate and Pendek lie off the coast between Batu Kapal and Tanjong Oemboeloe Soean. About 2 miles northward of the latter point is a round-topped tree on the slope of a ridge, only conspicuous from southward. Gosong Koelaga (Kulaga), about 4¼ miles northward of Tanjong Oemboeloe Soean, consists of patches of sand and stones, usually plainly marked by discoloration; two of the patches of sand dry, and are visible for some distance owing to their white colour. Tanjong Tampenan Bale, about 7½ miles northward of Tanjong Oemboeloe Soean, is the extremity of a hilly tongue of land and is fringed by a reef which extends about 1¾ cables offshore, and is usually marked by discoloration; good anchorage can be obtained near this point, in depths of from 9 to 10 fathoms ($16^{m}5$ to $18^{m}3$).

Chart 3470, plan of North Narrows.

Noordernauw.—Islets and dangers.—The western shore, between Tanjong Leibora and Hoek Haai, 5¼ miles northward, continues to be high and wooded. The eastern shore between Tanjong Tampenan Bale and Tanjong Laboenea (Labunea), about 12 miles north-north-eastward, is high and densely wooded. Kaholipana, an island about 5 cables offshore and 1½ miles eastward of Tanjong Leibora, is covered with tall trees, many of them dead, and showing white, bare trunks; Leboetan (Lebutan) and Poening (Puning), about 2 and 3¼ miles north-north-eastward of Kaholipana, respectively, are low, wooded islands, the former being fringed by a reef which extends about 3 and 2¼ cables from its south-western and northern sides, respectively, with a high rock on its north-western side.

Bali rif (*Lat. 4° 56′ S., Long. 122° 47′ E.*), with a depth of 2½ fathoms ($4^{m}6$) over it, lies about 7 cables off the western side of the channel

Chart 3470, plan of North Narrows.

and about 2½ miles north-north-eastward of Tanjong Leibora; Banka rif, with a depth of 2¾ fathoms ($5^{m}0$) over it, lies nearly 1½ miles farther north-north-eastward. Pulau Doea (Dua) are two small islets near the Moena coast and about 4 miles northward of Tanjong Leibora; they lie near the south-western end of a detached reef. Pulau Lima comprise six rocks lying 2½ cables offshore and 9 cables south-eastward of Hoek Haai; two of them are covered with vegetation and appear as one islet when seen from northward or southward. A small reef, with a depth of 3 fathoms ($5^{m}5$) over it, lies about 2 cables north-eastward of Hoek Haai. There is good anchorage in Baai van Lohia, immediately north-westward of Hoek Haai.

Reede Raha.—Lights.—Dangers.—Beacons.—Raha, the residence of a Government official and a shipping place for timber and forest produce, is situated on the western shore of Straat Boeton and about 3 miles north-westward of Hoek Haai; the houses of the village, and a large zinc roof, are visible from a considerable distance. A pier, with a flagstaff at the inner end, extends across the coastal reef.

Leading lights are situated on the pier; the front light is exhibited, at an elevation of 20 feet ($6^{m}1$), from an iron roof on the head of the pier, and the rear light is exhibited, at an elevation of 26 feet ($7^{m}9$), from a post on the middle of the pier.

There are several detached reefs in the roadstead; the outer one, with a depth of 3 feet ($0^{m}9$) over it, about 6 cables east-south-eastward of the head of the pier, is marked by a black beacon, surmounted by a cone, and a white beacon, surmounted by a ball, marks the northern extremity of a reef situated about 1½ cables west-north-westward of the outer beacon; a similar beacon marks the outer edge of a projecting part of the coastal reef about 2 cables north-eastward of the head of the pier. Small vessels can anchor northward of the detached reefs, in a depth of 4 fathoms ($7^{m}3$); the lights in line lead to the anchorage.

Reede Raha is bounded on the east by the meridian of 122° 45′ E., between the parallels of 4° 50′ S. and 4° 51′ 30″ S. and is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. The village is connected to the district telephone system.

Chart 2196.

Northern part of Straat Boeton.—The western shore, from Raha pier to Tanjong Lambiko, 11½ miles northward, is low and monotonous in appearance, except for the Laroeka (Laruka) heuvels, close to the coast about 4 miles northward of Raha; this part of the Moena coast is fringed by a wide reef, and there are a number of detached reefs up to a distance of 1½ miles from the shore. The eastern entrance to Straat Tioro (*see* page 514) lies between Tanjong Lambiko and the high Tikola peninsula, about 8 miles northward. Tempo village, where there is a pier, is situated about 2 miles north-westward of Tanjong Lambiko; vessels are forbidden to anchor within 5½ cables of the head of the pier in order to avoid fouling a telephone cable. *See* page 14.

The eastern shore, between Tanjong Gornea (*Lat. 4° 50′ S., Long. 122° 49′ E.*) and Labuan Blanda, about 25 miles north-north-eastward, is low, trees and mangroves growing to the water's edge; a reef extends about half a mile from Tanjong Gornea, and a small stream discharging here discolours the water of the strait for a considerable distance. Between Labuan Blanda and Tanjong Boeton (Buton), about 9 miles north-eastward, the coast is high and steep.

Charts 3616, 942a, 1263, 2759a.

Chart 3470, plan of Labuan Blanda anchorage.

Laboean (Labuan) Blanda is a high, thickly wooded islet close off the coast of Boeton; two rocks above water lie on the north-western part of the reef on which the islet lies. There is good anchorage about 2 cables offshore and about half a mile south-westward of the islet, in depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$).

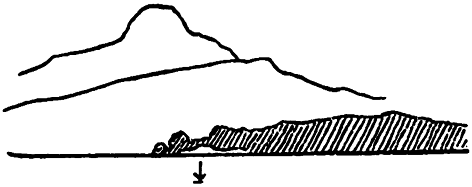
Chart 2196.

Baai van Kolono, on the Celebes shore, is entered between the Tikola peninsula and Tanjong Kolono, about 4¼ miles eastward, and is deep and clear of dangers. The north-eastern side of the bay is higher than the south-western side. The Celebes coast between Tanjong Kolono and Roode hoek (*Lat. 4° 20′ S., Long. 122° 54′ E.*), a high, steep, and rocky point, about 8½ miles north-north-eastward, is high.

Charts 3470, 2196.

Directions for Straat Boeton.—Approaching the southern entrance of Straat Boeton from westward or southward, the high land of Kabaëna, Kasteel berg on Moena, Rondtop and Saungkwea in the south-western part of Boeton, are useful landmarks; Rondtop, 1,368 feet ($416^{m}9$) high, about 7½ miles northward of Tanjong Lianawonti, comes in sight as a dark wood. Sioempoe, Lewoeto Kidi, and Kadatoea do not generally stand out clearly against the higher Boeton coast. Two small woods, on either side of Wambololi baai, on the south coast of Moena, are also noticeable from a considerable distance. If proceeding through Straat Massiri, the description of that strait, with careful attention to the reef in the northern entrance, given on page 517, should be referred to.

A vessel on nearing Straat Boeton should steer for the middle of Pulau Makasser, bearing 066°; there is a well-defined division between the southern wooded half of this island and the northern bare half. Attention should be paid to the tidal streams, observing that reefs extend from both entrance points. When the mosque of Boeton, near the flagstaff, bears 187°, she should keep it astern on that bearing, passing between Tanjong Baroe Baroe Koma and Tanjong Paprem-kama; when the latter point and the point south-eastward are in line bearing about 112°, she should alter course gradually north-eastward, and steer for Tanjong Kolakana, bearing 040°. Immediately Zuidernauw opens, or when Batu Kapal is seen clear of the western shore, bearing about 022°, the vessel may steer for Batu Sori, bearing about 031°, and thence keep in mid-channel. When she is through Zuidernauw she should steer for the middle of Drie heuvels, bearing 014°, which leads about 1¼ miles westward of Gosong Koelaga, bearing in mind that the tidal stream sometimes sets towards this shoal. When



Lambolo in line with the eastern side of Kaholipana, bearing 178°.

(*Original dated* 1931.)

Charts 3616, 942a, 1263, 2759a.

Charts 3470, 2196.

Lambolo is in line with Tanjong Tampenan Bale, bearing about 100°, she should steer for the north-western extremity of Kaholipana, bearing 045°, until the southern extremity of this island bears 090°, when she should steer about 020° and pass between Bali rif and the reef extending from the western side of Leboetan; when Lambolo comes in line with the eastern side of Kaholipana, bearing 178°, she should keep this alignment on astern, which leads eastward of Banka rif and well clear of the reef fringing Tanjong Laboenea (*Lat. 4° 52′ S., Long. 122° 49′ E.*); thence she can proceed in mid-channel out of the strait.

Vessels proceeding through Straat Boeton from northward should follow the directions just given in the reverse order.

Chart 2196.

BOETON.—South coast.—The south coast of Boeton, between Tanjong Lianawonti and Tanjong Batoe Toero (Batu Turo), 9 miles eastward, consists of three fairly high tongues of land, the middle one ending in a very prominent pyramidal mountain, 1,552 feet (473^{m}0) high; the coast is clear of dangers except for the coastal reef, which projects slightly in places. *See* view on chart 2196.

The two bays formed between the tongues of land have considerable depths, and the shores are steep-to. In Sampolawa baai, the western, there is good anchorage for vessels with local knowledge, in depths of from 18 to 27 fathoms (32^{m}9 to 49^{m}4), off the villages on the western side; there is a bank of sand and mud, which dries, extending about 4½ cables from the head, caused by Kali Sampolawa. Nalandi baai, the eastern, only affords anchorage at the head, in a depth of about 30 fathoms (54^{m}9), close to the coastal reef; the shores of this bay are sparsely populated.

Strong tidal streams sometimes cause heavy tide-rips off the three tongues of land on the south coast of Boeton.

East coast.—The east coast of Boeton is mountainous and thickly wooded almost throughout its length, but there are no distinctive peaks except a rounded summit, 1,821 feet (555^{m}0) high, nearly 10 miles south-south-eastward of Tanjong Boeton (Buton), the northern extremity of the island; this summit is very noticeable close offshore, but at a distance it loses its distinctive form. The numerous rocky points, however, afford excellent landmarks, except those in Kalowana Watobo, or Dwaal baai, the extensive bight lying between Tanjong Kassolanatoembi (Kassolanatumbi), about 36 miles north-eastward of Tanjong Batoe Toero, and Tanjong Goram, 24½ miles northward; the points in this bay are low and covered with mangroves. There are no dangers outside the 100-fathom (182^{m}9) line.

In the west monsoon there is frequent rain, but westerly winds are not experienced, only northerly or southerly. The tidal stream sets northward while the water is rising and southward while it is falling; off Tanjong Lelamoe (Lelamu), about 17 miles south-south-eastward of Tanjong Boeton, a rate of 3 knots was observed.

Anchorages.—Wadjo (Wajo) baai, in the southern part of the east coast of Boeton, is entered between Tanjong Kondowa (*Lat. 5° 31′ S., Long. 122° 54′ E.*), 12 miles north-north-eastward of Tanjong Batoe Toero, and Tanjong Laranka, 8¼ miles north-eastward; it is clear of dangers and deep, and affords anchorage in several places. Kamboelan Boengi (Kombolabolana), in the south-western part of the bay, is the

Charts 3616, 942a, 1263, 2759a.

Chart 2196.

most important village; there are great depths close off this village, however, and there is better and more sheltered anchorage off Bana Boengi, a village about 8 cables southward of Kamboelan Boengi. There is a pier, with a depth of 6½ fathoms ($11^{m}9$) alongside, and two mooring buoys off its head, at Bana Boengi; there is a mobile crane with a lifting capacity of 4 tons. Anchorage can be obtained east-south-eastward of the pier, in a depth of 16 fathoms ($29^{m}3$), about 2 cables offshore. Bana Boengi village is not visible from seaward, being hidden behind a coconut plantation, but a flagstaff near the root of the pier is noticeable.

On the opposite shore of this southern part of Wadjo baai, and about 1½ miles north-eastward of Bana Boengi, is Dongala village, in which is a prominent mosque. Good anchorage, in the west monsoon and during the transition periods, can be obtained off Tanjong Laranka, in a depth of 20 fathoms ($36^{m}6$), with this point bearing between 010° and 020°.

Anchorage may be obtained off the mouth of the rivulet Wiento, which discharges into the north-western side of Wadjo baai, 5 miles north-eastward of Kamboelan Boengi; the bottom is less steep here than at the other anchorages. The river is navigable for boats at half-tide.

The coastal reef between Tanjong Kassolanatoembi and the entrance to Telok Kamaroe, 10½ miles north-westward, is difficult to see after heavy rains owing to the muddy water. Wammollokkoe (Wammollokku) village is situated at the mouth of Sungei Malaugé, about 1½ miles west-north-westward of Tanjong Kassolanatoembi. Sheltered anchorage for vessels with local knowledge can be obtained here, in a depth of 25 fathoms ($45^{m}7$), with the mouth of the river bearing 248°, and Batu Sangoe (Sangu), a rock on the coastal reef off Tanjong Laboradjo (Laborajo), nearly 2 miles north-westward of the village, just touching the coast, bearing 309°; to avoid the reefs, this anchorage should be approached with the mouth of the river bearing 242°.

Ondola baai, entered about 8 miles north-westward of Tanjong Kassolanatoembi, is very narrow, and, unless the coastal reef extending from the eastern entrance point is clearly visible, a boat should be sent ahead to mark the entrance.

Telok Kamaroe (Kamaru) affords good anchorage to vessels with local knowledge, in a depth of 30 fathoms ($54^{m}9$), off Kamaroe (Kamaru) village, on the north-western shore of the bay; this village is situated on a plateau, and there is a noticeable clump of dark trees near it. There is a landing pier for boats on the southern side. A reef, with a depth of 5 feet ($1^{m}5$) over it, lies about 1¼ cables outside the coastal reef on the western side of the entrance, but otherwise the bay is clear of dangers.

Telok Kaloekoe (Kaluku), entered about 3 miles north-westward of Telok Kamaroe, is deep and clear of dangers, except in the south-eastern corner of the bay, where the coastal reef projects about 4 cables and there is a detached reef close offshore. Namboe (Nambu) village is situated on the north-western shore.

Telok Kambawogeno is a small bay entered nearly 8 miles north-north-westward of Tanjong Tomara (*Lat. 5° 08′ S., Long. 123° 02′ E.*), the south-eastern entrance point of Telok Kaloekoe, and between it and Boeboe (Bubu) village, about 4 miles farther northward, there is

Charts 3616, 942a, 1263, 2759a.

Chart 2196.

no coastal reef, and the bottom, consisting of mud and sand, is less steep; a reef, with a depth of 1¼ fathoms (2^{m}3) over it, lies about one mile eastward of Boeboe (*Lat. 4° 57′ S., Long. 122° 58′ E.*).

Latambera village is situated on the coast about 7½ miles north-north-eastward of Boeboe, and there is anchorage for vessels with local knowledge between this village and Pombelaä, an island close to the coast about 2¼ miles eastward. When approaching this anchorage, however, care should be taken to avoid a 1¼-fathom (2^{m}3) patch and a 3-fathom (5^{m}5) patch lying close to the coast about 3 and 2½ miles south-south-eastward of Latambera, respectively; there is also a reef, with a depth of 1½ fathoms (2^{m}7) over it, about one mile southward of Tanjong Perapaeja (Perapaeya), the western extremity of Pombelaä; these reefs are only slightly marked by discoloration.

Chart 3470, plan of Telok Koro.

Telok Koro, entered between Tanjong Batoeëja (Batuëya), the south-eastern extremity of Pombelaä, and Tanjong Goram, about 5½ miles eastward, can be navigated without difficulty as far as Sabela Bilasso, an island at the head of the bay. Ereke village stands at the head of an inlet, not accessible for vessels, on the eastern side of the bay; Koro village is also situated on the eastern shore, about 2¾ miles southward of Ereke, but the bottom there is too steep except for temporary anchorage. All the islands in the bay, except Pombelaä, are mangrove swamps; a prominent rock lies on the coastal reef extending a short distance southward from Tanjong Batoeëja.

Chart 2196.

Telok Lakansai lies close southward of Tanjong Boeton. Several reefs, two of which dry, lie on the southern side of the entrance; vessels approaching from southward or eastward should pass outside these reefs and southward of a reef, with a depth of 1¾ fathoms (3^{m}2) over it, lying about 2½ miles south-south-eastward of Tanjong Boeton. Vessels from northward with local knowledge can take the inshore passage westward of the latter reef.

PASSAGE VAN BOETON.—Passage van Boeton (Buton) is the deep and wide channel clear of dangers along the south and east coasts of Boeton; it is bounded on the south by Batoe Ata (chart 3616), an island about 29 miles southward of Tanjong Lianawonti, and on the south-east by Toekang (Tukang) Besi eilanden. This passage is easy to navigate by day or night and under all circumstances.

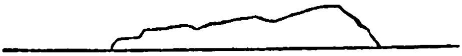
Passage van Boeton lies on the dividing line between the drift currents of the Banda sea eastward of Celebes and those of the Banda sea southward of Celebes, whilst amongst Toekang Besi eilanden and under the Boeton coast the tidal streams predominate; the horizontal movement of the water is, therefore, most irregular, and it is impossible to foretell its direction at any given time. Although vessels passing through this passage have never reported currents of any importance, it is advisable to keep in mind the possibility of a considerable set in one direction or another; there is no lack of landmarks for fixing the vessel's position from time to time. The rate of the drift current in the Banda sea eastward of Celebes seldom attains 2 knots, and that southward of Celebes seldom exceeds one knot.

Chart 3616.

Outlying islet and reef.—Batoe (Batu) Ata or Hagedis eiland,

Chart 3616.

(*Lat. 6° 13′ S., Long. 122° 42′ E.*), rises steeply from the sea on all sides except the eastern, which terminates in a long sandy point, planted with coconut trees and fringed by a wide reef. The only anchorage is in a bight on the northern side of the island, where a ridge, with depths of less than 10 fathoms (18^{m}3), over it, runs about 1½ cables outside the coastal reef, enclosing a basin, with depths of from 20 to 24 fathoms (36^{m}6 to 43^{m}9). The above ridge branches off from the coastal reef about one mile south-eastward of the northern extremity of the island, and connects again to the coastal reef about 6 cables farther south-eastward; there is one patch which dries near the middle of the ridge, and several patches in the north-western half, with depths of from 2 to 3 fathoms (3^{m}7 to 5^{m}5) over it. In the west monsoon small vessels can cross the ridge and anchor in the basin north-eastward of the second sandy beach from the northern extremity of the island; in the east monsoon vessels lie better outside the ridge. The bottom is rocky and uneven, and there is always a risk of losing the anchor. The island is well populated, and has two villages and a number of scattered houses.



Batoe Ata, bearing 158° 20 miles.

(*Original dated* 1947.)

A reef, which dries, lies about 5 miles southward of the eastern extremity of Batoe Ata.

Charts 3239, 3616.

TOEKANG BESI EILANDEN.—Light.—Toekang (Tukang) Besi eilanden, consist of numerous islands, with many groups lying together on the same reef. The Wangi Wangi, Kaledoepa, and Tomea groups, and the islands Binongko and Roendoema, are inhabited; most of the remainder are merely wooded patches of sand and coral, and are only occasionally visited. Except on Roendoema, there are landing piers of coral rock at the villages, and at some of the villages on Binongko, crude artificial breakwaters have been constructed. There is running water on Wangi Wangi and Kaledoepa; on Tomea and Binongko somewhat brackish water is obtained from wells in the coral.

Little is known of the tidal streams, except that they run strongly between the islands; in general, the tidal streams set north-westward during rising water and south-eastward during falling water.

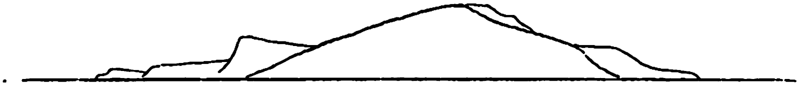
Charts 2196, 3239, 3616.

Wangi Wangi group.—This group, at the north-western end of Toekang Besi eilanden, consists of the islands Wangi Wangi, Kambode, and Kampenaoene (*Lat. 5° 25′ S., Long. 123° 37′ E.*), with a few islets between, all lying together on one reef. Wangi Wangi, the northern and largest of this group, is hilly and is fringed by a steep-to reef, which dries, usually plainly marked by discoloration. Off the north and east coasts there is a narrow barrier reef, running parallel with the coastal reef at a distance of from one to 2¾ cables, leaving a channel between, with depths of from 14 to 27 fathoms (25^{m}6 to 49^{m}4). The barrier reef along the north coast dries in its western part, and the remainder has depths of from one to 6 fathoms (1^{m}8 to 11^{m}0) over it,

Charts 942a, 1263, 2759a.

Charts 2196, 3239, 3616.

terminating eastward at Pulau Tiga, a group of rocky islets on the coastal reef extending about half a mile from the north-eastern extremity of the island; the barrier reef here is not so plainly marked by discoloration. In some areas enclosed by the reef around the Wangi Wangi group there are relatively great depths, and off the south-west coast of Wangi Wangi there is a large lagoon, with depths of 8 fathoms ($14^{m}6$) in places.



Wangi Wangi, bearing 186°, 16 miles.

(*Original dated* 1947.)

Kambode, off the south-west coast of Wangi Wangi, has a hill, 377 feet ($114^{m}9$) high, in the middle; Kampenaoene, off the south coast of Wangi Wangi, is lower than Kambode. Midden eiland lies between Kambode and Wangi Wangi; Soemanga and Timor lie between Kampenaoene and Wangi Wangi.

Two detached reefs, with depths of 2¼ and 3½ fathoms ($4^{m}1$ and $6^{m}4$) over them, respectively, lie within about one mile north-north-eastward of Timor and southward of the barrier reef off the east coast of Wangi Wangi; a reef, which dries, lies about 2 miles eastward of Timor, and a 2¼-fathom ($4^{m}1$) patch lies nearly one mile southward of the same islet.

Light.—A light is exhibited, at an elevation of 490 feet ($149^{m}3$), from a white iron framework structure, 69 feet ($21^{m}0$) in height, on the north-western side of Wangi Wangi.

Chart 2196.

Bocht van Wandji.—Anchorage.—Reede van Wangi Wangi lies at the head of Bocht van Wandji (Wanji), between the south-west coast of Wangi Wangi and the north coast of Kambode. There is anchorage for vessels with local knowledge, in depths of from 25 to 30 fathoms ($45^{m}7$ to $54^{m}9$), off a long stone pier extending across the coastal reef close southward of Mendati village, on the south-west coast of Wangi Wangi, with the eastern side of Midden eiland bearing 137°; the depths here are very irregular. Two detached reefs lie near the coastal reef northward of Kapetan village, situated on the north coast of Kambode, and a 1¾-fathom ($3^{m}2$) patch lies near the coastal reef of Wangi Wangi about 2¼ miles northward of the stone pier. A Government official is stationed at Mendati. Vessels of the Koninklijke Paketvaart Maatschappij visit this place occasionally.

The south-east-going stream sets into the bay with rising water and the north-west-going stream out of the bay with falling water; during the survey, from the middle of October to the middle of December, the rate seldom exceeded half a knot. Farther in, at the anchorage, a rate of from 2 to 3 knots was observed when the coastal reef was either drying or uncovering, but this only lasted a short time; the direction here was very irregular and sometimes two or three tidal streams were observed running in opposite directions.

Vessels wishing to communicate with Mendati (*Lat.* 5° 20′ *S.*,

Chart 2196.

Long. 123° 32′ E.) during the North-west monsoon, when the above anchorage may be unsafe, can proceed to the bight in the reef between Kambode and Kampenaoene; a boat can then pass into the lagoon off the south-west coast of Wangi Wangi through an opening in the reef, steering for the western of two clumps of trees on the lower slopes of Wangi Wangi, bearing 035°.

Chart 3239.

Kaledoepa group.—Anchorages.—This group lies south-eastward of the Wangi Wangi group, and is separated from it by a deep channel about 3 miles wide; it consists of the islands Kaledoepa, Hoga, and Lintea (Noord), all lying on the same reef, the outer edge of which is very steep-to. Hoga is uninhabited.

Vessels of deep draught with local knowledge can anchor westward of an opening in the reef between Hoga and Kaledoepa. A reef, which dries, lies in the middle of the opening in the reef, and the passage through lies between the drying reef and the coastal reef of Hoga, which is marked by discoloration; there is a least depth of 3¾ fathoms (6^{m}9) in this passage, but the fairway is only about a quarter of a cable wide at the eastern end owing to a spit, with a depth of 1¾ fathoms (3^{m}2) over it, extending northward from the eastern end of the drying reef. Vessels, the draught of which will permit them to pass through this opening in the reef, will find good anchorage, in a depth of 14 fathoms (25^{m}6), in a deep basin just inside. A rock, barely marked by discoloration, which dries, marked by an unofficial beacon, surmounted by a red and black horizontally-striped mark, lies about 4½ cables eastward of the drying reef in the opening. The edges of the coastal reef are also marked by beacons placed by the natives; a strong current runs through at times.

Tomea group.—The Tomea group, south-south-eastward of Kaledoepa and separated from it by a deep channel about 7 miles wide, consists of the islands Tomea, Tolandono, Tokobao, and Zuid Lintea. Tolandono lies on the south-western side of the reef, which dries, fringing Tomea; Tokobao and Lintea lie on the northern side of a large atoll-shaped reef separated from the Tomea reef by a deep channel, clear of dangers, 9 cables wide, through which a strong current runs. Tomea is 887 feet (270^{m}4) high, and the fringing reef is steep-to; it is well-populated, and the inhabitants live in large villages. Tolandono is low, with steep coasts, and a sandy beach near the south-western extremity; it is sparsely populated. Tokobao is a sandbank covered with vegetation. Lintea rises to an elevation of 269 feet (82^{m}0) in the middle, and is sparsely populated.

Anchorages.—The best anchorage for vessels with local knowledge is southward of Oeskoe village, situated in about the middle of the south coast of Tomea, with a roof on the stone pier, extending from the village, in line with the western summit of the island, 823 feet (250^{m}8) high, bearing about 344°, in a depth of 18 fathoms (32^{m}9); this position is about midway between two 7-fathom (12^{m}8) patches lying about 3½ cables southward of the head of the pier, and close to the coastal reef; eastward and westward of these patches there are several reefs with depths of from 1¾ to 2¾ fathoms (3^{m}2 to 5^{m}0) over them. An opening in the coastal reef leading to the pier is generally marked by two unofficial stake beacons, but a boat cannot reach the pier at high water.

Charts 942a, 1263, 2759a.

Chart 3239.

Under favourable conditions anchorage can be obtained by vessels with local knowledge off the broad coastal reef extending from the north-west coast of Tomea, in a depth of 28 fathoms ($51^{m}2$), with the northern extremity of Tomea, bearing 097°, and the western side of Tomea, bearing 172°, but caution is necessary owing to the irregular edge of the coastal reef and some detached reefs, with depths of 1¾ fathoms ($3^{m}2$) over them, near it; there is a small pier at Waha village (*Lat. 5° 43′ S., Long. 123° 55′ E.*), situated on the north-west coast of Tomea, but it can only be reached by boats at high water. About three-quarters of a mile southward of this anchorage there is an opening in the coastal reef leading to a deep basin, available for small vessels. There is also anchorage for small vessels in a bight in the coastal reef about half a mile northward of Tolandano, taking care to avoid a reef, which is seldom marked by discoloration, with a depth of 1¼ fathoms ($2^{m}3$) over it, lying in the middle.

Binongko.—Binongko, about 4½ miles south-eastward of Zuid Lintea, consists of raised coral terraces; the northern part is higher than the southern, and there is a depression between the two. There are several well-populated villages on its coasts, but the interior is waste land; Popalia, in about the middle of the west coast, where a native chief resides, is the principal village. There is no anchorage off the village, but there is a large natural harbour for praus in the coastal reef, which can be entered from either northward or southward.

Palahidoe village is situated on the north-east coast and about 1½ miles south-eastward of the northern extremity of the island. Good anchorage can be obtained by vessels with local knowledge in a basin in the coastal reef off this village; this basin has a diameter of about 1½ cables, with depths of from 16 to 25 fathoms ($29^{m}3$ to $45^{m}7$), and the entrance is about half a cable wide, with a depth of 13 fathoms ($23^{m}8$). The basin is entered from eastward, and vessels should moor; the tidal streams are strong. From the south-eastern entrance point of this basin a barrier reef extends parallel with the coast as far as Roekoewa village, about 2 miles south-eastward of Palahidoe; the space inside the barrier reef is, however, too narrow for anchorage, and the entrance, situated at the north-western end, is very narrow, and has a depth of only 3¼ fathoms ($5^{m}9$).

Charts 2196, 3239.

Atoll reefs north-westward of Binongko.—Karang Kapotta, the north-western of these reefs, lies with its north-western extremity about 8½ miles south-westward of Kambode; it has two narrow openings, both on the north-western end of the reef, and the northern of these, with a least depth of 3¾ fathoms ($6^{m}9$), over it, is the safer.

Karang Kaledupa lies south-eastward of Karang Kapotta, and is separated from it by a deep passage about 2 miles wide. This reef has two entrances at its south-eastern end, with depths of about 9 fathoms ($16^{m}5$) in the fairway of each.

Chart 3239.

Islets and reefs in the eastern part of the group.—Karang Koka, an atoll reef 14½ miles eastward of Binongko, has three entrances, two on its southern side and one on its north-eastern side; the latter, which has a least depth of 3 fathoms ($5^{m}5$) in the fairway, is the best, but it should be marked by beacons before entering.

Moro Maha, the south-easternmost of the Toekang Besi group, lies

Chart 3239.

about 32 miles east-south-eastward of Binongko, and is a thickly wooded sandbank on a reef, which dries.

Tjowo Tjowo, about 13 miles northward of the northern end of Karang Koka, is an islet formed of raised coral, and is fringed by a reef. Kenti Ola lies about 10 miles north-eastward of Tjowo Tjowo, and is similar to that islet.

Karang Koro Maha, about 13 miles north-eastward of the northern extremity of Binongko, is an atoll reef with two narrow entrances on its northern side, only available for small craft.

Roendoema, nearly 27 miles northward of Tjowo Tjowo, lies on the south-eastern part of a long, narrow reef and is 247 feet ($75^{m}3$) high; Anano (*Lat. 5° 18′ S., Long. 124° 18′ E.*), 95 feet ($29^{m}0$) high, lies on the north-western part of this reef. Roendoema is inhabited, but the village is not visible from seaward. Karang Roendoema, a reef lying about 4½ miles south-eastward of Roendoema, is marked by discoloration.

Good anchorage can be obtained by vessels with local knowledge inside the atoll reefs of the Toekang Besi group; once inside the entrances navigation is not difficult, as the dangers are plainly marked by discoloration. The atoll reefs are usually marked by clear green discoloration, visible from a considerable distance, and are generally steep-to along their outer edges; temporary huts of fishermen are often seen on the shoaler patches.

Charts 942a, 1263, 2759a.

CHAPTER XVI

EAST COAST OF CELEBES: FROM STRAAT WOWONI TO THE SOUTHERN ENTRANCE POINT OF GOLF VAN TOMINI—BANGGAI ARCHIPEL AND WESTERN PART OF SOELA EILANDEN

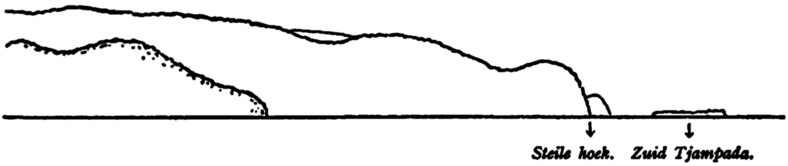
Chart 2196.

STRAAT WOWONI.—Straat Wowoni, which is practically a continuation northward of Straat Boeton (page 517), is formed on the western side by the Celebes coast between Roode hoek (page 522) and Toro Pemali, about 17 miles north-north-westward, and on the eastern side by Wowoni eiland. Although somewhat obstructed by reefs, especially on the eastern side of the southern part, which is unsafe for navigation, there is no lack of good landmarks, and the navigation is, therefore, not difficult; the reefs, however, are not clearly marked by discoloration.

The tidal streams set northward and southward through the strait, and may attain a rate of 3 knots; there is practically no period of slack water, except at neap tides, and even then it is only of short duration.

The South-east monsoon is fairly strong in the strait, especially from 1000 to 1600.

Roode hoek (*Lat. 4° 20′ S., Long. 122° 54′ E.*) is a steep, bare, rocky point of a reddish colour, and the Celebes coast northward is high and steep; a small reef, with a depth of 1¼ fathoms ($2^{m}3$) over it, lies in the bight about 2 miles north-north-westward of Roode hoek. Steile hoek, on the western side of the strait and about 5½ miles northward of Roode hoek, is noticeable from both northward and southward; Hooge klip (High rock), about one mile southward of Steile hoek and half a mile offshore, is a useful landmark.



Straat Wowoni, southern entrance.

(*Original dated* 1931.)

Charts 3616, 942a, 1263, 2759a.

Chart 2196.

Twee Gebroeders (Two Brothers), lying on the coastal reef about 6½ miles northward of Steile hoek, are two rocks, 50 feet (15^{m}2) high, and covered with vegetation. Pemali gebergte, 2,244 feet (684^{m}0) high, close southward of Toro Pemali, are the only noticeable summits on the Celebes shore of the strait.

The west coast of Wowoni is hilly, but affords no conspicuous landmarks; the southern part of this coast should be given a wide berth owing to the numerous detached reefs lying up to a distance of fully 3 miles offshore.

Climate and weather.—*See* page 17.

Islands and dangers.—Beacons.—West Tweeling, about 1½ miles north-north-eastward of Steile hoek, consists of two coral heads, with a least depth of 1¾ fathoms (3^{m}2) over them; the northern head is marked by a white beacon surmounted by a ball, and equipped with reflectors.

Zuid Tjampada (Champada) and Noord Tjampada (Champada) are two low wooded islands lying from about 3 to 4 cables off the Celebes shore, about 2¾ and 4¼ miles, respectively, northward of Steile hoek. Noord Tjampada consists of two parts, lying close together on a reef which dries. There is a deep channel, clear of dangers, between these islands and the Celebes shore; it is not, however, recommended, especially in the North-west monsoon, when heavy squalls sometimes come down from the mountains, completely obscuring the land. A black beacon, surmounted by a cone, and equipped with reflectors, marks the south-eastern extremity of the reef on which Zuid Tjampada lies.

Noorder rif (North reef), with a depth of 2¾ fathoms (5^{m}0) over it, lies in the middle of Straat Wowoni, about 3¾ miles northward of Noord Tjampada.

The positions of the other reefs in the strait can best be seen on the chart.

Charts 2196, 3148.

Islets and dangers in northern and north-western approaches to Straat Wowoni.—From Tanjong Pamali (*Lat. 3° 59′ S., Long. 123° 01′ E.*), the northern extremity of Wowoni, a ridge of reefs, broken here and there, extends westward just within the 100-fathom (182^{m}9) line for about 25 miles, up to the entrance to Kendari baai.

Taka Langgara is an extensive reef, which dries, lying about 1¼ miles west-south-westward of Tanjong Pamali. Oost (East) bank, 1¼ miles south-westward of Taka Langgara, consists of several isolated patches, with a least depth of 2 fathoms (3^{m}7) over them. Three reefs, with depths of from 3 to 6 feet (0^{m}9 to 1^{m}8) over them, lie about midway between Oost bank and Noorder rif.

Middle bank, about 7 miles westward of Tanjong Pamali, has a least depth of 2½ fathoms (4^{m}6) over it and is steep-to. West bank, about 1½ miles farther westward, has a least depth of 2½ fathoms (4^{m}6) at its western end.

Lingoro rif, with a least depth of 3¾ fathoms (6^{m}9) over it, lies about 3¼ miles west-north-westward of West bank; the passage between these two is usually taken by vessels proceeding through Straat Wowoni.

Zuid Saponda, about 1¼ miles northward of Tanjong Laonti, situated about 4 miles westward of Toro Pemali, is a low islet covered with high trees; the fringing reef extends about 6 cables northward and north-

Charts 3616, 942a, 1263, 2759a.

Charts 2196, 3148.

eastward from the islet, and a detached reef, which dries, lies about 3 cables south-westward of the islet.

Midden (Middle) Saponda lies near the western end of a reef about 3½ miles north-north-westward of Zuid Saponda, and much resembles that islet. Poeloehari droogten (Puluhari banks) cover a large area between these two islets and dry in places; a detached reef, with a depth of 3 feet ($0^{m}9$) over it, lies off the south-western end, about 3¼ miles westward of Zuid Saponda. The reefs farther westward are described with Kendari baai, on page 535. For obstructions, *see* page 534.

Noord Saponda, 6¾ miles north-north-eastward of Midden Saponda, is also a low islet covered with tall trees. Reefs extend for about 3 miles westward and about one mile eastward from this islet.

Wowoni.—Anchorages.—The coasts of this island, except that bordering Straat Wowoni, are steep-to, so that there are few anchorages.

There is anchorage in the bight north-eastward of Tanjong Wowoni, the rocky southern extremity of the island, but there is a 2¾-fathom ($5^{m}0$) patch lying close offshore in this bight, 3 miles from Tanjong Wowoni. Kia Kia village stands at the head of a small bay about 7½ miles north-eastward of Tanjong Wowoni, and good anchorage may be obtained here in the west monsoon. Batu Sangi Sangi lies on the coastal reef extending from the south-western entrance point of the bay. Tanjong Watoetembatoe (Watutembatu), the eastern extremity of the island, is rocky.

Anchorage may be obtained off Dimba and Ladianti, on the north-east coast and in the bight between Tanjong Pamali and Tanjong Dongkalaja (Dongkalaya), a low point covered with mangroves, about 7¾ miles east-south-eastward; these anchorages are only serviceable in the west monsoon. Tanjong Pamali is partly rocky, and terminates in a sand spit. Except for a summit, 1,545 feet ($470^{m}9$) high, about 2 miles southward of Tanjong Dongkalaja, the mountains on Wowoni are difficult to identify.

There is safe anchorage in both monsoons in Reede Langgara, off Langgara Boegis (Bugis), a village situated on the north-west coast; there are, however, several reefs in this roadstead, and it should, therefore, only be used by vessels with local knowledge.

Chart 2196.

Directions for Straat Wowoni.—A vessel bound for Straat Wowoni from Straat Boeton can hold the Celebes coast, steering for Hooge klip (*Lat. 4° 15′ S., Long. 122° 55′ E.*), which can be passed fairly closely on its eastern side; thence she should bring Roode hoek in line with the western side of Hooge klip, bearing 183°, astern, which leads close westward of the beacon marking West Tweeling and close eastward of the beacon marking the reef on which Zuid Tjampada lies; these beacons should be given a berth of at least one cable. A vessel approaching the southern entrance of Straat Wowoni from eastward can steer for Hooge klip, and then keep on the alignment astern mentioned above, thus avoiding the dangerous area on the eastern side of the strait.

Charts 2196, 3148.

After passing westward of Noorder rif the vessel should steer for Noord Saponda, passing between Westbank and Lingoro rif; when Tanjong Laonti is in line with Zuid Saponda, bearing about 210°, a

Charts 2196, 3148.

north-westerly course should be steered so as to bring the western side of Zuid Saponda in line with the eastern side of Midden Saponda, bearing about 169°, astern, which leads between the reefs extending westward from Noord Saponda and that extending from the Celebes coast opposite.

A vessel bound for Kendari baai from Straat Wowoni should follow the directions given for Zuid vaarwater leading to that bay on page **536**.

If proceeding through Straat Wowoni from northward, the directions just given should be followed in the reverse order.

Chart 2196.

EASTERN SIDE OF CELEBES.—Staring baai.—Dangers.—Buoy.—Staring baai, entered between Tanjong Laonti and Tanjong Wowobatoe (Wowobatu), nearly 6 miles west-north-westward, is of little importance to shipping, as, although there is anchorage almost everywhere, it is backed by high, partly inaccessible, mountainous land, and the district is sparsely populated.

There are several islets along the shores of the bay, the largest being Wawasoengoe (Wawasungu), joined to the southern shore by a reef, which dries; there is a Government timber settlement at the head of a small bay southward of this islet, and good anchorage can be obtained here. Kali Laonti flows into Telok Laonti in the south-eastern corner of the bay; the channel giving access to the river runs along the eastern shore of Telok Laonti, and has a bar, with a depth of about 10 feet ($3^{m}0$) over it; the river itself is deep, and the eastern side of the entrance is steep and rocky, whilst the western side is muddy and covered with mangroves.

The shores of Staring baai are fringed by a reef, which, between Tanjong Wowobatoe and Tanjong Tiram, about 3 miles southward, extends nearly one mile offshore. There are several reefs in the bay, the positions of which may best be seen on the chart.

A 3¾-fathom ($6^{m}9$) shoal, marked by a conical buoy painted in red and black bands, lies about 1¼ miles west-north-westward of the western entrance point of Kali Laonti.

Charts 2196, 3148.

Obstructions.—Obstructions, indicated on the chart, in the eastern and northern approaches to Staring baai, lie across the channel north-eastward and south-westward of Zuid Saponda, and eastward of the southern extremity of Sappa Djambi droogte (*see* below).

Approaches to Kendari baai.—Reefs and beacons.—Northward of Tanjong Wowobatoe (*Lat.* 4° 02′ *S.*, *Long.* 122° 40′ *E.*) the coast forms a funnel-shaped bay, with the island Boengkoe (Bungku) toko lying in the inner part, and a passage leading into Kendari baai. The shores of this bay are fringed by a wide reef, and about 5½ miles northward of Tanjong Wowobatoe is Bakori, an islet lying on the northern part of a large reef; this islet does not show plainly against the land behind. Kendari heuvel, about 2½ miles north-westward of Tanjong Wowobatoe, is 696 feet ($212^{m}1$) high, and very prominent, and Staring gebergte, on the western side of Staring baai, is also prominent, but Nipa Nipa gebergte, northward of Kendari baai, has no distinctive summits.

The approach to the above bay is encumbered by numerous reefs, the principal being Poeloehari droogten (page **533**) and Sappa Djambi

Charts 2196, 3148.

(Jambi) droogte, which dries, situated about 2½ miles northward of Tanjong Wowobatoe. Two channels, known as Noord vaarwater (North channel) and Zuid vaarwater (South channel), respectively, lead into the bay. Zuid vaarwater leads southward and westward of these two reefs, and is marked on its south-western side by two black beacons, each surmounted by a cone and equipped with reflectors, and on its north-eastern side by two white beacons, each surmounted by a ball and equipped with reflectors. The south-eastern black beacon stands on a small reef usually marked by discoloration, which dries only at the lowest tides, about 1½ miles eastward of Tanjong Wowobatoe, and the north-western beacon marks the eastern extremity of a reef lying about 3 miles northward of the same point; the south-eastern white beacon marks the southern extremity of Sappa Djambi droogte, and the northern beacon marks the western side of this bank. Noord vaarwater is marked by a black beacon, surmounted by two truncated cones, standing on the northern extremity of Sappa Djambi droogte, which is plainly marked by discoloration.

Kendari baai.—Northward of Boengkoe toko is a narrow, winding, but deep passage, leading into Kendari baai; this passage is about three-quarters of a cable wide in its narrowest part, and the southern side is marked by four black beacons, each surmounted by a cone, and the outer one, marking the northern edge of the reef extending about one cable from the northern extremity of Boengkoe toko, being also equipped with reflectors; the northern side of the passage is marked by a white beacon, surmounted by a ball, and equipped with reflectors. Within the entrance the bay gradually widens, but the inner part is occupied by an extensive mudbank; Lepo Lepo rivier flows into the head of the bay, but the mudbank here can only be crossed by boats at high water, although there are depths of about 5 feet (1$^{\text{m}}$5) in the river.

The tidal streams in the bay and in the channels between the reefs which dry in the approach are strong at times.

A flagstaff stands on the western side of Boengkoe toko, where there is a sharp bend in the passage, and a cone or ball is displayed when a vessel is sighted.

Kendari village, the residence of a Government official, is situated on the western side of an inlet in the northern shore of the bay, just within the entrance. There is a landing pier, where water can be supplied through a pipe to boats.

Reede Kendari, which is bounded by the meridians of Tanjong Tjabi (Chabi), situated about 1½ miles north-eastward of the northern extremity of Boengkoe toko, and of the middle of the mouth of Lepo rivier, is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and there is a district telephone service.

Swept channel.—A channel has been swept from a position about three-quarters of a mile north-eastward of the beacon marking the northern extremity of Sappa Djambi droogte to the anchorage off Kendari village (*Lat. 3° 58′ S., Long. 122° 35′ E.*).

Prohibited anchorage.—A telephone cable crosses the entrance to Kendari baai about half a mile westward of Boengkoe toko, and each landing place is marked by a notice board; anchoring and fishing are prohibited within one cable of the line joining these notice boards. *See* page 14.

Charts 3616, 942a, 1263, 2759a.

Charts 2196, 3148.

Anchorage.—Directions.—Anchorage, which has been swept, may be obtained by vessels with local knowledge off Kendari village (*Lat. 3° 58′ S., Long. 122° 35′ E.*), in depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$), but the holding ground of very soft mud is not good, and a vessel is liable to drag her anchor in heavy squalls. The southern shore, opposite the village should not be closely approached as reefs extend about 2 cables from it.

A vessel proceeding to Kendari baai from Straat Wowoni should pass southward of Zuid Saponda and the detached reef lying south-westward of it, taking care to avoid the obstruction in that vicinity, and then enter Zuid vaarwater by the passage between the south-western side of Poeloehari droogten and the detached reef marked by a black beacon about 1½ miles eastward of Tanjong Wowobatoe; until this beacon is sighted, Kendari heuvel is a useful mark for which to steer. Thence the vessel should pass south-westward of the two white beacons marking Sappi Djambi droogte, and eastward of the black beacon marking the detached reef on the western side of the channel; the latter beacon can be rounded and course shaped towards the entrance of Kendari baai, when Kendari heuvel comes in line with a summit, 1,621 feet ($494^{m}1$) high, lying about 3 miles south-westward, bearing about 219°.

In the narrow passage leading to Kendari baai the vessel should keep in mid-channel to avoid the coastal reef extending from each side, passing southward of the white beacon at the entrance, and northward of the four black beacons. When approaching the sharp bend by the flagstaff on the western side of Boengkoe toko a blast on the syren or whistle should be given, as it is impossible to see if a vessel is approaching from the opposite direction; if there is a strong tidal out-going stream, the northern shore of this bend should not be held too closely, as, when past the point, the vessel is liable to be set on to this shore. The passage south-westward of Boengkoe toko is only available for boats at high water.

A vessel from northward should approach with the western side of Zuid Saponda in line with the eastern side of Midden Saponda, bearing about 169°, which leads about 5 miles eastward of Tanjong Nipa Nipa, a prominent steep point about 8 miles northward of Tanjong Wowobatoe; when Bakori bears about 250°, she should steer for the entrance to Noord vaarwater, passing not less than one cable north-westward of the black beacon marking the northern extremity of Sappa Djambi droogte, and then follow the directions given above for a vessel approaching from Straat Wowoni.

Chart 3148.

TANJONG NIPA NIPA TO STRAAT SALABANGKA.—

Coast.—From Tanjong Nipa Nipa to Tanjong Tampakoera (Tapoauluna), the southern entrance point of Straat Salabangka and about 45 miles north-north-westward, the coast is indented by four bays, Lasolo, Telok Dalam, Matarapé, and Tampakoera (Tampakura). The various projecting points are high and steep, affording good landmarks. The high mountains of the interior are usually obscured by clouds, and are only visible after heavy rain in the North-west monsoon. The most noticeable mountains near the coast are:—Boeldoeng (Buldung), 869 feet ($264^{m}9$) high, about 14 miles west-north-westward

Chart 3148.

of Tanjong Nipa Nipa (*Lat. 3° 54′ S., Long. 122° 40′ E.*); Meloehoe (Meluhu) gebergte, 2,228 feet (679^{m}1) high, about 8½ miles westward of Boeldoeng; Tinowo, 2,796 feet (852^{m}2) high, the highest peak of Lasolo gebergte and about 3½ miles north-north-westward of Meloehoe gebergte; also the summits of the islands Bahoeloe (Bahulu) and Labengké, in the northern part of Lasolo baai.

Within the 100-fathom (182^{m}9) line are many islets and reefs; some of the latter dry, but in any case they are scarcely marked by discoloration. The islets are mostly high and noticeable; the coral islets lying farther seaward are low, but, owing to the heavy growth on them, are usually visible about 10 miles in clear weather. The inner route, through the northern part of this reef area, is described on page 538, but a great portion westward of this route has not yet been thoroughly surveyed, and fresh dangers continue to be reported.

Sungei Sampara flows out through a wide sandbank about 10 miles westward of Tanjong Nipa Nipa. Moeara (Muara) Sampara village, situated at the mouth of this river, is a collecting place for forest produce; vessels with local knowledge can obtain anchorage here, but it is unsafe in the east monsoon.

Sawah village, situated close to the southern entrance point of Lasolo baai and about 7½ miles north-westward of Moeara Sampara village, is also a collecting place for forest produce. Vessels with local knowledge can anchor in the bay immediately westward of Sawah, but this area has only been partly surveyed; the western side of this bay is formed by a tongue of land, which terminates in Tanjong Teïpa, with a wooded hill, 479 feet (146^{m}0) high, on its extremity. Lasolo baai, Telok Dalam, Matarapé and Tampakoera baaien are of little importance to general shipping; they have not been thoroughly surveyed, and numerous reefs have already been found and continue to be reported; the positions of these can best be seen on the chart. Vessels visiting any of these bays should exercise the utmost caution.

Lasolo baai is the southernmost and its shores are the most populated of the four. Bahoeloe is an island lying close offshore in its northern part; Lasolo rivier flows out through three mouths westward of this island; Lasolo village, situated about 16 miles up the river, can be reached by boats through the middle mouth, but the river is not easily navigated.

Straat Labengké, between Labengké and the mainland, is clear of dangers and deep; there are two islets in the southern entrance, and the passage on either side of them can be used. There is a waterfall on the Celebes side, about half way through the strait, and a vessel can anchor close to the shore here. The passage between Labengké and De Haan eilandje is unsafe.

Telok Dalam and Matarapé baai are almost uninhabited; several islands lie across the entrance to the latter.

Tampakoera baai is encumbered by numerous reefs, some of which dry.

Outlying islands and dangers.—South reef, with a depth of one fathom (1^{m}8) over it, and not marked by discoloration, lies close outside the 100-fathom (182^{m}9) line and about 12 miles north-westward of Tanjong Nipa Nipa (*Lat. 3° 54′ S., Long. 122° 40′ E.*).

Manoei (Manui) is an island, 1,027 feet (313^{m}0) high near its south-eastern extremity, lying 29½ miles north-eastward of Tanjong Nipa

Charts 3616, 942a, 1263, 2759a.

Chart 3148.

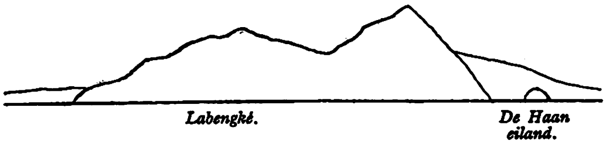
Nipa ; it is rocky and steep on its eastern, southern, and western sides, with an occasional sandy beach between the rocky points. From this island a chain of islets and reefs extends about 24 miles north-westward, terminating in Pangadjarang (Pangajarang), which lies just outside the 100-fathom ($182^{m}9$) line. All the islets are low, and on many of the reefs, which dry, are sandbanks which only cover at very high water ; in the South-east monsoon there is a heavy surf on all of them. Owing to the uncertain tidal streams and currents this area should be avoided. Manoei is inhabited and fertile ; there are also numerous buffalo and goats on it. Oeloenamboe (Ulunambu), situated on the eastern part of the north coast, is the only village. A barrier reef, with deep water between it and the reef fringing the coast, extends along a great portion of the north coast ; there is an opening, about 2 cables wide, in the barrier reef off Oeloenamboe (*Lat. 3° 34′ S., Long. 123° 08′ E.*), and vessels with local knowledge can obtain anchorage, in depths of from 25 to 30 fathoms ($45^{m}7$ to $54^{m}9$) just inside this opening, taking care to avoid a 2¾-fathom ($5^{m}0$) patch in the middle of it.

Padea besar and Padea kechil are low, partly wooded islets lying on reefs about 3¾ miles north-north-eastward and 2¼ miles northward, respectively, of the western extremity of Manoei ; there is a permanent fishing village on the reef extending from the western side of Padea besar. Kokoïla and Loenas Waloe (Lunas Walu), about 9 miles west-north-westward and 9½ miles north-westward, respectively, of Padea besar, and Samaringa, 2¼ miles eastward of Pangadjarang, are all low. These islets together with Silatang, Tordella, Bolewang, Boboeboe (Bobubu), Dai Sanga and Taka Belantang, the remaining islets and reefs, which dry, are only visited periodically by fishermen.

Inner route between Tanjong Nipa Nipa and Straat Salabangka.—Between Tanjong Nipa Nipa and the southern entrance to Straat Salabangka there is a direct route, the northern part of which leads through the numerous reefs within the 100-fathom ($182^{m}9$) line. Although this route has been found to be safe, mariners must always bear in mind the possibility of the existence of uncharted dangers. Little is known of the tidal streams and currents, but these may attain some strength, and, especially in the vicinity of Serdang riffen, sometimes set across the route. Some of the reefs are marked by beacons, and the numerous landmarks in the vicinity give every facility to enable a vessel to keep to the route described below.

Islands and reefs.—Beacons.—The following islands and reefs lie near the inner route to Straat Salabangka :—

Labengké is an island, 2,346 feet ($715^{m}0$) high, lying about one mile eastward of the peninsula separating Telok Dalam from Matarapé baai. De Haan eilandje, 472 feet ($143^{m}9$) high, lies nearly one mile off the



Labengké, bearing 326°, 10 miles.

(*Original dated* 1947.)

Charts 3616, 942a, 1263, 2759a.

Chart 3148.

south-eastern side of Labengké. De Haan rif, with a least depth of 3 feet (0^{m}9) over it, lies about 1¼ miles eastward of De Haan eilandje.

Zuid (South) bank, 2½ miles northward of De Haan eilandje, dries; a black beacon, surmounted by a cone, stands on its eastern side. Two patches, with depths of less than 6 feet (1^{m}8) over them, lie between Zuid bank and De Haan eilandje (*Lat. 3° 29′ S., Long. 122° 29′ E.*).

Serdang riffen, about 2 miles north-eastward of Zuid bank, have heads with depths of only 3 feet (0^{m}9) over them.

Noord (North) bank lies 3 miles northward of Zuid bank and dries; its eastern side is marked by a black beacon, surmounted by a cone. A reef, which dries, lies about 1¾ miles north-westward of this beacon.

Van Leeuwen eiland lies close off the northern entrance point of Matarapé baai, about 6½ miles northward of Labengké, and is very prominent. Zuid (South) Hinder, a small reef, which dries, lies about 2½ miles eastward of Van Leeuwen eiland, and is marked by a white beacon, surmounted by a ball, on its western edge. Noord (North) Hinder, about 1¾ miles north-north-westward of Zuid Hinder, has a least depth of 2 feet (0^{m}6) over it. A reef, about one mile south-eastward of Noord Hinder, also dries.

Pulau Doea (Dua) are two low islets covered with high trees, and lie about 4¼ miles and 6¼ miles, respectively, eastward of Van Leeuwen eiland.

Directions for the Inner route.—A vessel from southward, having passed between Tanjong Nipa Nipa and Noord Saponda on the leading mark given for Straat Wowoni on page 533, should steer for the summit of Van Leeuwen eiland, bearing 333°; this course crosses the 100-fathom (182^{m}9) line in approximately the position where the eastern peak of Labengké is in line with the southern side of De Haan eilandje, bearing about 294°. When near De Haan rif the black beacon on Zuid bank should be visible and should be brought in line with the eastern side of Van Leeuwen eiland, bearing about 338°, which leads eastward of De Haan rif. Thence the vessel should pass about half a cable eastward of the beacons on Zuid bank and Noord bank, and about the same distance westward of the white beacon on Zuid Hinder. Then she should steer for the southern entrance to Straat Salabangka by keeping Zuid Hinder beacon between the bearings of 203° and 210°, astern, which will lead eastward of Adder (page 540); the summit of De Haan eilandje in line with the eastern side of the western Pulau Doea, bearing 188°, astern, also leads eastward of this reef. For the passage westward of Adder, *see* page 541.

A vessel proceeding southward from Straat Salabangka should follow the directions just given in the reverse order.

STRAAT SALABANGKA.—Straat Salabangka, between the Salabangka eilanden and the Celebes coast, affords a safe route from Tanjong Tampakoera to Hoek Nederburgh, a high steep promontory, about 18 miles north-westward. The northern entrance, westward of Papado (Padabalé), the westernmost island of the Salabangka group, is narrowed to a width of about 4 cables by reefs on either side, and the tidal streams run through at a considerable rate. The fairway is deep.

The only noticeable landmark on the Celebes side of the strait is a white patch on the slope of the mountains about 1¾ miles westward

Charts 3616, 942a, 1263, 2759a.

Chart 3148.

of Tanjong Salabangka (*Lat. 3° 03′ S., Long. 122° 18′ E.*), a point 8 miles southward of Hoek Nederburgh. All the points are low, but are covered with high trees. A reef extends as much as one mile from the coast between Tanjong Tampakoera and Tanjong Baja (Baya), 4¾ miles north-westward. The bay between Tanjong Salabangka and Tanjong Boeleleh (Buleleh), about 3½ miles northward, has not been thoroughly examined, and vessels should, therefore, keep outside the line joining these two points. The mountains between these two points rise close to the coast. Batu Manoe (Manu), a rock covered with vegetation, lies close off Hoek Nederburgh.

Salabangka eilanden are low and covered with shrubs, except for a hill, 663 feet ($202^{m}1$) high, on the southern side of Oembele (Tokoaya), in about the middle of the group, and a conspicuous hill, 282 feet ($85^{m}9$) high, on the northern side of Papado. All the islands are fringed by a coral reef, which dries, with many detached reefs inside the 100-fathom ($182^{m}9$) line. There is a deep passage through the middle of the group, between Oembele and Boenginkela (Bunginkela), about 2¼ miles westward, but Karel droogte, the northern part of which dries, lies in the southern entrance; this passage can only be used when the reefs are clearly marked by discoloration, and provided the tidal streams are not strong. Sainoa (Sinoa) eilanden, at the eastern end of the group, consist of two low islands and a number of rocks, partly covered with vegetation, the northernmost being 29 feet ($8^{m}8$) high; there is a noticeable tree on Boengintindeh (Matindeh), the south-western islet of the group. The surrounding water area, within the 10-fathom ($18^{m}3$) line, is of a light green colour, visible from a considerable distance. Togomolo, about 5 miles southward of Sainoa eilanden, is a low islet, but may be identified by a large tree on it.

Anchorage.—Salabangka village, a collecting place for forest produce and the residence of a native Government official, is situated on Kaleroang, an islet about half a mile south-westward of Boenginkela; Hondor is an islet lying about 7 cables south-westward of Kaleroang. There is anchorage, in a depth of about 30 fathoms ($54^{m}9$), with Hondor bearing 102°, distant about one mile, and the western extremity of Boeadjangka (Buajangka), situated about 6 cables south-westward of Papado, bearing 000°; this anchorage is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Dangers.—Beacons.—Buoy.—Adder, a reef, with a depth of 2½ fathoms ($4^{m}6$) over it, lies about 1¾ miles eastward of Tanjong Tampakoera, and is seldom marked by discoloration.

Generaal Pel, a reef, with a depth of 3 feet ($0^{m}9$) over it, lies about 1½ miles north-north-westward of Adder, and a 6-fathom ($11^{m}0$) patch lies between them. A white beacon, surmounted by a ball, stands on Generaal Pel.

A black beacon, surmounted by a cone, marks the edge of the coastal reef extending north-eastward from Tanjong Baja. A detached reef, with a depth of one fathom ($1^{m}8$) over it, lies about 1¼ miles eastward of Tanjong Baja (*Lat. 3° 08′ S., Long. 122° 26′ E.*).

A reef, with a depth of 3¼ fathoms ($5^{m}9$) over it, lies about 1¼ miles south-westward of Hondor, and is marked on its south-eastern side by a conical buoy painted in black and white bands.

A white beacon, surmounted by a ball, marks the edge of the reef extending about 4 cables from the north-western extremity of Papado.

Charts 3616, 942a, 1263, 2759a.

Chart 3148.

Between Tanjong Boeleleh and Hoek Nederburgh a ridge of reefs lies parallel with, and at a distance of about one mile from the coast; a portion of this ridge, near the southern extremity, dries, and the remainder is usually plainly marked by discoloration. Bantam, a reef with a depth of 1¾ fathoms ($3^{m}2$) over it, lies about 2½ miles north-north-eastward of Hoek Nederburgh, and a reef, with a depth of 3 feet ($0^{m}9$) over it, lies the same distance northward of the cape.

Directions.—A vessel entering Straat Salabangka from southward may pass on either side of Adder; if passing eastward she should be careful to keep on the alignment astern, bearing 188°, given in the directions for the Inner route on page 539 as this reef is seldom marked by discoloration. A vessel with local knowledge can pass westward of Adder by keeping the western extremity of Pulau Doea astern, bearing 180°, which will bring the beacon on Generaal Pel right ahead, which she should pass about 1½ cables on its western side; there is frequently a strong tidal stream in the passage between Adder and Tanjong Tampakoera (*Lat. 3° 11′ S., Long. 122° 29′ E.*).

When Hondor bears 300° the vessel should steer for it on that bearing, or if Hondor cannot be identified, Togomogolo may be kept astern, bearing 120°. When the beacon north-eastward of Tanjong Baja is in line with the point near Baja (Baya) village, bearing about 255°, she should alter course westward and bring Tanjong Baja in line astern with Tanjong Tonona (Togotonona), bearing about 120°; this alignment leads south-westward of the reef marked by the conical buoy south-westward of Hondor. The vessel should continue on this alignment until nearing Tanjong Salabangka, when she may alter course northward, taking care, however, that Hondor does not bear more than 107° until the beacon off Papado opens eastward of Hoek Nederburgh; this beacon can be rounded at a distance of about half a cable, and then brought in line with the white patch westward of Tanjong Salabangka, bearing about 216°, astern, which leads clear between the reefs on either side of the northern entrance. *See* view facing page 542.

A vessel entering the strait from northward should bring the white patch westward of Tanjong Salabangka in line with the beacon north-westward of Papado, bearing about 216°, and after passing close westward of this beacon she should keep it well open eastward of Hoek Nederburgh until Hondor bears 107°, when she should bring Tanjong Baja in line with Tanjong Tonona, bearing 120°, and then follow the directions given above in the reverse order.

A vessel proceeding through the deep passage between Oembele and Boenginkela from northward should steer for Karel droogte, bearing about 206°, which leads between the reefs in the entrance; when the northern extremity of Boenginkela is in line with Hoek Nederburgh, bearing about 317°, she should steer 153° into Straat Salabangka. The tidal streams in the passage may be strong, and northward of the islands may attain a rate of 1½ knots.

COAST.—Talowa baai, entered between Tanjong Lalompa, situated about 5 miles north-westward of Hoek Nederburgh, and a point about 5½ miles farther north-westward, has general depths of from 20 to 50 fathoms ($36^{m}6$ to $91^{m}4$); the shore is fringed by a moderately wide reef, and there are some rocks covered with vegetation at the head of the bay. There are no villages of any importance. Alang Alang or

Charts 3616, 942a, 1263, 2759a.

Chart 3148.

Zutphen eiland lies on the reef extending from the north-western entrance point.

Off-lying reefs.—Several reefs lie near the 100-fathom ($182^{m}9$) line off Talowa baai. Kijk uit lies about 1¾ miles east-north-eastward of Tanjong Lalompa (*Lat. 2° 53′ S., Long. 122° 15′ E.*) and just outside the 100-fathom ($182^{m}9$) line, and partly dries; Dwars in den weg, about 2¼ miles north-eastward of Tanjong Lalompa, also dries. Further steep-to reefs north-westward of Dwars in den weg render the approach to Talowa baai dangerous; the positions of these can best be seen on the chart.

Chart 3616.

Coast.—Tanjong Laroga lies about 3 miles north-westward of Alang Alang, thence to Tanjong Losoni, 9½ miles north-westward, there is a low strip of land along the coast, the mountains lying a short distance inland; the fairly important villages Bahoenpombini (Bahunpombini) and Kolono lie in the northern part, westward of Tanjong Losoni, and at the entrance to a cleft in the mountains. Anchorage can be obtained by vessels with local knowledge off these villages, in a depth of 27 fathoms ($49^{m}9$). A reef, which dries, lies 3¼ miles north-westward of Tanjong Laroga, and 1½ miles offshore.

Tanjong Losoni may be identified by three hills on it, the highest having an elevation of 702 feet ($214^{m}0$), behind which the mountains rise steeply.

Reede Losoni.—Losoni village lies at the head of a small bay about 3 miles north-westward of Tanjong Losoni, but only a couple of houses are visible from seaward. A reef, which dries, extends from the coast for about 2 miles north-westward of Tanjong Losoni, and north-westward of this reef two large detached reefs run parallel with the coast, and about one mile from it, over a distance of about 3 miles; between these two reefs, which dry in places, is a deep passage nearly half a mile wide. The northern extremity of the south-eastern reef is marked by a stake beacon during the months that vessels of the Koninklijke Paketvaart Maatschappij visit the roadstead.

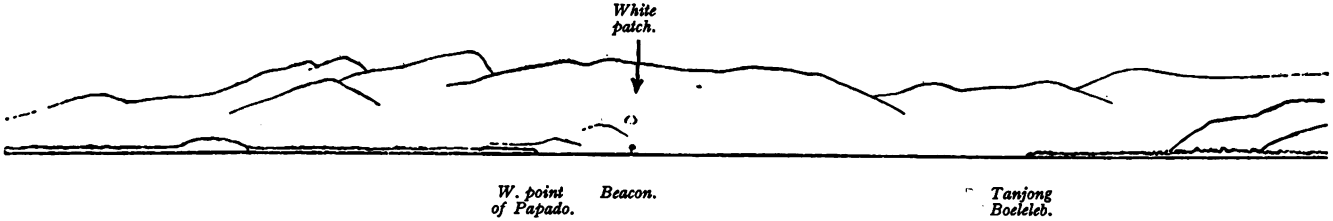
Good anchorage, in a depth of 16 fathoms ($29^{m}3$), sheltered in both monsoons, can be obtained by vessels with local knowledge between the reefs and the coast, as far southward as possible, where there is a bight in the coastal reef; this anchorage should be approached steering 247°, passing northward of the beacon.

Chart 2195, plan of Bungku road.

Reede Boengkoe.—Boengkoe (Bungku) is a prosperous village, with a considerable trade in forest produce, situated about 5½ miles north-north-westward of Losoni village; it is the residence of a native Government official and a native prince, and there are a number of Chinese traders. The village is entirely hidden by coconut trees, but its position can be identified from a great distance by Kondeh (chart 3616), 1,890 feet ($576^{m}1$) high, with a very prominent wood on its summit, about 1½ miles inland. *See* view facing this page.

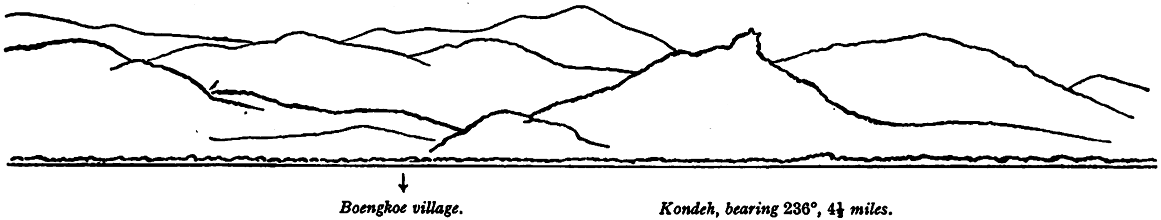
The coast near the village is fringed by a wide reef, and outside this a line of reefs runs parallel with the shore, leaving a narrow channel, with depths of over 10 fathoms ($18^{m}3$), between it and the coastal reef. A stone pier (*Lat. 2° 33′ S., Long. 121° 58′ E.*) extends from the village, and on its northern side there is a small bight in the coastal reef; north-eastward of the pier the reef barrier is broken for

Charts 3616, 942a, 1263, 2759a.



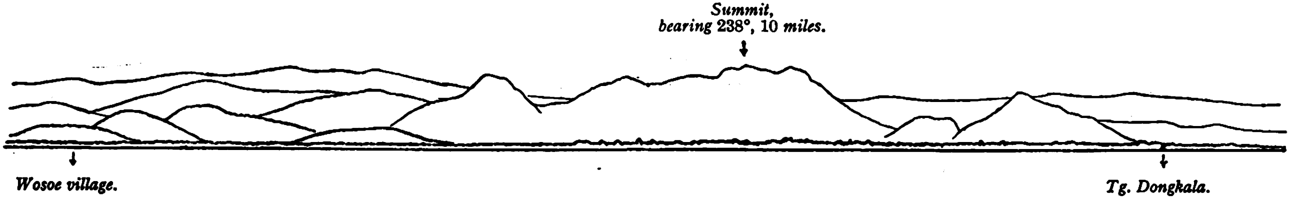
Celebes, east coast. Leading mark for Straat Salabangka.

(*Original dated* 1947.)



Celebes, east coast. Reede Boengkoe.

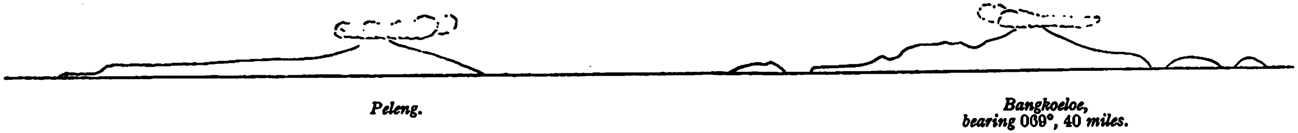
(*Original dated* 1931.)



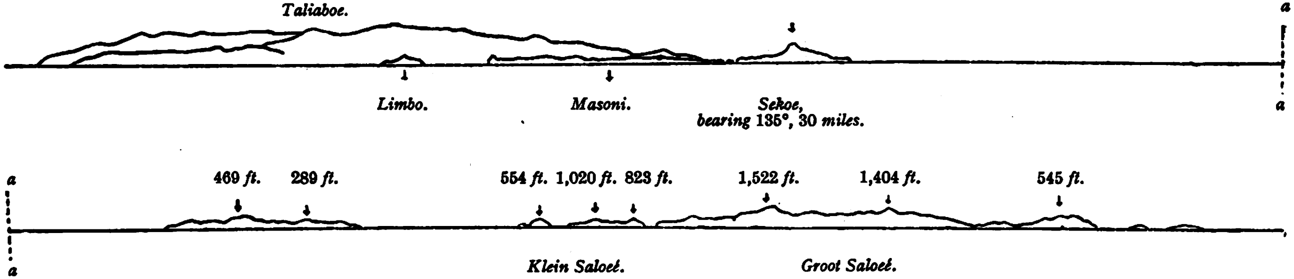
Celebes, east coast. Mountains north-westward of Wosoe village.

(*Original dated* 1931.)

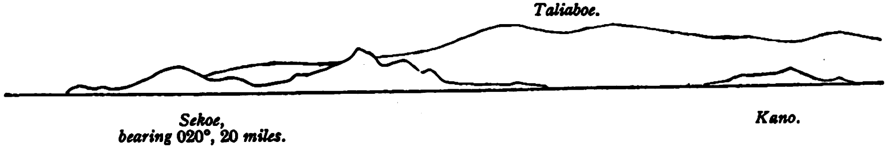
To face page 543.



Banggai archipel from south-westward.
(*Original dated* 1947.)



View, in two parts, of Greyhound strait from northward.
(*Original dated* 1931.)



Greyhound strait from southward.
(*Original dated* 1931.)

Chart 2195, plan of Bungku road.

a distance of nearly 3 cables. A small detached reef, with a depth of 1¼ fathoms ($2^{m}3$) over it, on the northern side of the entrance passage, is difficult to identify.

The anchorage is north-eastward of the head of the pier, in depths of from 16 to 25 fathoms ($29^{m}3$ to $45^{m}7$); southerly and easterly winds quickly raise a swell. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3616.

Coast.—The line of reefs off Boengkoe terminates about one mile northward of that village, and thence the coast is clear as far as Wosoe (Wosso) village, 13½ miles north-north-westward of Boengkoe; anchorage can be obtained by vessels with local knowledge, in depths of from 10 to 12 fathoms ($18^{m}3$ to $21^{m}9$), with the middle of Wosoe village bearing 225°, taking care to avoid four reefs, which dry, and rocks lying about 4 cables offshore eastward of the village.

Chart 2549.

Northward of Wosoe many reefs lie near the coast and near the edge of the 100-fathom ($182^{m}9$) line, which gradually increases its distance from the coast. At Tanjong Dongkala, 3¾ miles north-north-westward of Wosoe, the mountains near the coast terminate, and a strip of low land occupies a width of some miles within the coast as far as the entrance to Tomori baai. A noticeable white sandbank, always above water, lies about one mile north-westward of Tanjong Dongkala. *See* view facing page 542.

A number of reefs lie off the coast between Tanjong Dongkala and Tanjong Bahoenbelo (Bahunbelo), a low and steep-to point about 11½ miles north-westward (*see* view on chart 2549); those near the route taken by vessels making for Tomori baai from southward are described below. Good anchorage can be obtained close under the coast westward of Tanjong Bahoenbelo, where there is a storage place for forest produce. The bight between this point and Tanjong Lingkoboe (Lingkobu), 11¾ miles north-westward, is free from dangers between the line joining these two points and the 3-fathom ($5^{m}5$) line, and the depths decrease gradually towards the coast.

Reefs in the approach to Tomori baai.—Beacons.—A narrow reef, clearly marked by discoloration, lies close within the 100-fathom ($182^{m}9$) line, with its southern extremity about 9 cables north-eastward of Tanjong Dongkala. A reef, with a depth of 5 feet ($1^{m}5$) over it, lies about 5 miles northward of Tanjong Dongkala, and its northern side is marked by a black beacon, surmounted by a cone. Between these two reefs lie three other dangerous reefs.

A reef, which dries, lies about 1¼ miles eastward of Tanjong Tabau, situated 3¼ miles east-south-eastward of Tanjong Bahoenbelo; a reef, with a depth of 3 feet ($0^{m}9$) over it, lies about 1½ miles northward of Tanjong Tabau, and is marked by a white beacon, surmounted by a ball; several other dangers lie close eastward of this reef.

A white beacon, surmounted by a ball, marks a reef with a depth of 1¾ fathoms ($3^{m}2$) over it, lying about 2 miles eastward of Tanjong Lingkoboe (*Lat. 2° 03′ S., Long. 121° 32′ E.*), and a similar beacon marks a reef, with a depth of 3 feet ($0^{m}9$) over it, lying about half a mile farther northward. A black beacon, surmounted by a cone, marks the northern edge of the bank which extends about 6 cables from Tanjong Lingkoboe; a similar beacon marks the northern edge

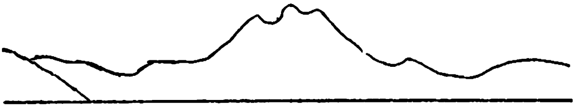
Chart 2549.

of the bank extending from Boengi (Bungi) ntimbe, an island close offshore about 3¼ miles north-westward of Tanjong Lingkoboe.

All the above reefs lie near the route given in the directions for Tomori baai on page 546; a number of isolated reefs lie a few miles northward of this route, as shown on the chart.

Innumerable reefs, the positions of which can best be seen on the chart, lie within the 100-fathom ($182^{m}9$) line between lat. 2° 00′ S., and 1° 33′ S. Usually the water outside Tomori baai and in the bay as far as the entrance to Lambolo and Tambajoli baaien is very muddy, so the reefs are difficult to distinguish by their discoloration, but in these two bays the water is very clear, and the reefs are generally marked by discoloration, but the utmost caution should be exercised when navigating in this vicinity. A black beacon, surmounted by a cone, marks the northern side of a reef lying just inside the 100-fathom ($182^{m}9$) line about 20 miles northward of Tanjong Dongkala.

TOMORI BAAI.—Islands and dangers.—Tomori baai, entered between Tanjong Bahoenbelo and Tanjong Bea, 13 miles north-north-westward, is fairly free from dangers, and has general depths of from 20 to 34 fathoms ($36^{m}6$ to $62^{m}2$); inside the bay are many smaller bays, the principal being Lambolo and Tambajoli. The land on either side of the entrance is low, but elsewhere around the bay it is mountainous, except at the head of Tambajoli baai, where there is a marshy strip at the mouth of Sungei Bajoli. About 2¼ miles west-north-westward of Tanjong Lingkoboe is Batoe (Batu) Pon, a very prominent hill, 590 feet ($179^{m}8$) high, and about 2¾ miles farther in the same direction is a prominent mountain, 1,875 feet ($571^{m}5$) high. On the northern side of the bay Buitenste heuvel, about 9 miles northward of Tanjong Bea, is 1,535 feet ($467^{m}9$) high and prominent, and Toekala (Tukala) gebergte, farther northward, can be identified from a great distance; its eastern and south-eastern sides are very steep; this range has four peaks, the northernmost and highest (chart 3616), situated about 12 miles northward of Buitenste heuvel, having an elevation of 8,622 feet ($2{,}628^{m}0$). Marowali, 6,732 feet ($2{,}052^{m}0$) high, about 9½ miles south-westward of the northernmost peak of Toekala gebergte, and Ronde berg, 5,728 feet ($1{,}745^{m}9$) high, 4¾ miles east-north-eastward of Marowali, are also prominent. A sharp peak, 4,734 feet ($1{,}443^{m}0$) high, about 6½ miles south-westward of Marowali (*Lat. 1° 42′ S., Long. 121° 32′ E.*), is also noticeable, especially from southward.



Toekala gebergte, bearing 336°.

(Original dated 1931.)

There are a number of islands in Tomori baai, and these may be divided into two main groups. The outer group stretches across the bay in an east and west direction, comprising the islands Roembia (Rumbia), Batoe (Batu), Nanaka, Nanasi, Balo Soempi (Sumpi), Tomori, with several islets and rocks extending northward from it, and Dediri. A shoal, with a depth of 3 feet ($0^{m}9$) over it, lies about

Charts 3240, 3616, 942a, 1263, 2759a.

Chart 2549.

1½ miles north-westward of Nanaka (*Lat. 1° 56′ S., Long. 121° 29′ E.*). The other group runs in a north and south direction, dividing Lambolo baai into two parts, and comprises the islands Toko Dimba, Paka Paka, and several islets lying close together farther southward; Batu Tengah, a rock covered with vegetation, lies between Paka Paka and the coast eastward.

The thickly wooded island Tokobaë, 1,978 feet ($602^{m}9$) high, lies off the entrance to Tambajoli baai, at the head of Tomori baai; a small islet lies on the reef projecting from the north-eastern extremity of Tokobaë.

The entrance channel to Tomori baai is divided into two parts by a reef, with a least depth of about 2 feet ($0^{m}6$) over it, lying about 2½ miles north-eastward of Tanjong Lingkoboe; other reefs lie between this reef and Roembia.

Breakers have been reported about 1¾ miles southward of Roembia.

The south-western shore of Tomori baai is sparsely populated, and the same applies to the islands, except Boengi ntimbe (page 544). The northern shore of the bay is practically uninhabited.

La rivier, one of the largest in the middle part of Celebes, discharges through a delta between Tanjong Lingkoboe and Boengi ntimbe. The eastern arm of the delta is seldom used, and has depths of not more than 3 or 4 feet ($0^{m}9$ or $1^{m}2$). The northern arm is entered westward of Boengi ntimbe, where it is about one cable wide, which is maintained to the junction of the La moito, nearly one mile south-south-westward of Boengi ntimbe; there are depths here of from 5 to 6 feet ($1^{m}5$ to $1^{m}8$), and thence the river narrows to less than a quarter of a cable, with increased depths of from 11 to 23 feet ($3^{m}4$ to $7^{m}0$). In the rainy season the water level is considerably higher; at high water large praus can easily reach Tompira, a village about 10 miles above Boengi ntimbe.

Anchorages.—Light.—Very good anchorage can be obtained by vessels with local knowledge northward of Boengi ntimbe; the village on this island is a collecting place for forest produce, and loading and unloading can be carried out here under all weather conditions.

Kolonodale, on the western side of the head of Lambolo baai, is the residence of a Government official and is the export place for produce from the surrounding district. There is a landing pier where boats can go alongside at all times, and a very prominent white Custom house stands close southward of it. There is good anchorage for vessels with local knowledge about 1½ cables eastward of the pier, in depths of from 6 to 7 fathoms ($11^{m}0$ to $12^{m}8$). Kolonodale is connected to the general telephone system, and the roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

A light is exhibited, at an elevation of 36 feet ($11^{m}0$), from a flagstaff on the head of the pier at Kolonodale.

In Tambajoli baai there is anchorage at a suitable distance from the mudbank extending from the mouth of Sungei Bajoli. Sungei Bajoli and Sungei Soemara (Sumara) discharge after flowing through a cleft between Peleroe (Peleru) gebergte and Tamboesisi (Tambusisi) gebergte; the mouths of these two rivers form deltas, the land being marshy and covered with mangroves. Sungei Bajoli is the easier to navigate, and has depths of about 7 feet ($2^{m}1$) in the western mouth;

Charts 3240, 3616, 942a, 1263, 2759a.

Chart 2549.

Watambajoli village (*Lat. 1° 44′ S., Long. 121° 19′ E.*) stands about 3 miles above the entrance.

Anchorage can also be obtained by vessels with local knowledge off the mouth of Sungei Morowali, which flows out on the north-eastern shore of Tomori baai about 2½ miles north-north-westward of Batoe.

Directions.—Besides Toekala gebergte, which is visible from a great distance, the islands Roembia, Batoe and Tomori, which is very steep on its south-western side, and the prominent hill Batu Pon afford good landmarks when nearing the bay.

A vessel approaching Tomori baai from southward should keep outside the 100-fathom (182ᵐ9) line until 6 miles northward of Tanjong Dongkala; the black beacon marking the 5-foot (1ᵐ5) reef lying about 5 miles northward of this point should then be well in sight, and the 100-fathom (182ᵐ9) line can be crossed northward of this beacon. Thence she should steer towards the white beacon on the reef about 1¼ miles northward of Tanjong Tabau, passing northward of the reef which dries, about 1½ miles eastward of this point, and at least one cable southward of the white beacon, and then bring it astern, bearing 112°, continuing thus until the black beacon on the bank extending from Tanjong Lingkoboe bears 323°, when she should steer for it on this bearing. When within a distance of about 2 miles of Tanjong Lingkoboe she can alter course northward so as to pass westward of the two white beacons marking the reefs lying about 2 miles eastward of this point; thence she should bring the northern of these two white beacons astern, bearing 126°, which leads north-eastward of the black beacon marking the edge of the bank extending from Boengi ntimbe, and for the passage between Dediri and the southern extremity of Tomori, thence passing between the latter island and the coast westward by eye.

If bound for Kolonodale the vessel can pass either eastward or westward of the islands in Lambolo baai. If taking the eastern passage care should be taken to pass clear eastward of a small reef, with a depth of one fathom (1ᵐ8) over it, lying about 1½ cables off the south-eastern extremity of Toko Dimba; the route then lies between Paka Paka and Batu Tengah, altering course for Kolonodale when southward of the southernmost islets of the group. The passage along the western side of Lambolo baai is not recommended except for those acquainted with the locality, as three detached reefs lie in the narrow passage between the reef extending from the southern group of islets and Tanjong Tapahoeloe (Tapahulu), a point on the mainland opposite; the best passage, which is only about a quarter of a cable wide, is close along the wide reef extending from Tanjong Tapahoeloe.

A vessel bound for Tomori baai from northward should cross the barrier reef on the edge of the 100-fathom (182ᵐ9) line close northward of the black beacon on the northern side of the reef about 20 miles northward of Tanjong Dongkala; thence she should bring this beacon astern, bearing 080°, keeping it thus until Batoe Pon is sighted right ahead, when she should steer for it, bearing 260°. When the summit of Tomori is in line with the southern extremity of Roembia, bearing 282°, she should proceed on this alignment, which leads fairly close southward of Tanjong Onee Matoeboe (One Matubu), 3¼ miles westward of Tanjong Bea (*Lat. 1° 58′ S., Long. 121° 37′ E.*). Thence she

Charts 3240, 3616, 942a, 1263, 2759a.

Chart 2549.

should alter course north-westward and pass north-eastward of Batoe, and bring the islet on the reef extending from the north-eastern extremity of Tokoboe in line with the point on the northern side of the bay, about 3¾ miles south-eastward, bearing 312°. If proceeding to Tambajoli baai the vessel can proceed as requisite; if bound for Kolonodale she should follow the directions given above, taking care to avoid the reef, with a depth of 3 feet ($0^{m}9$) over it, lying about 1½ miles east-north-eastward of the northern extremity of Tomori.

COAST.—Dangers.—Beacons.—The coast between Tanjong Bea and Tirongan, a village about 16 miles north-eastward, is low and marshy; Toekala gebergte and other prominent summits, described on page 544, lie some distance inland. North-eastward of Tirongan the mountains approach nearer the coast, which becomes steep and rocky until near Tanjong Damari, a high point about 10 miles north-eastward of Tirongan. Boba, a prominent islet, lies on the coastal reef about 4 miles north-eastward of Tirongan, and Moemoe (Mumu), a small rocky islet, lies on the reef extending from Tanjong Damari. Toekala (Tukala), about 3 miles south-south-westward of Tirongan, is the principal village along this part of the coast, and can be identified by the flagstaff of the native chief's house; Badaro is situated at the head of a deep inlet entered about 2 miles east-north-eastward of Boba, and Tjaka (Chaka) village is situated on the north-eastern shore of this inlet.

Chart 3240.

The coast between Tanjong Damari and Tanjong Rata, about 9 miles east-north-eastward, continues to be high, but between Tanjong Rata and Tanjong Menahakeh, a low point about 20 miles east-north-eastward, there is a wide strip of low land along the coast, the mountains lying some distance inland; Schuine berg, about 12 miles northward of Tanjong Rata, and 5,570 feet ($1{,}697^{m}7$) high, is prominent.

Ondolean is a small village situated amidst coconut trees at the mouth of Sungei Boentoe, a small river flowing out about 4½ miles north-eastward of Tanjong Damari; there is a noticeable house with a zinc roof in the village, and the river can be entered by boats at all times. The coastal reef north-eastward of Ondolean is very irregular, and a detached reef, which dries, usually plainly marked by discoloration, lies about one mile south-eastward of the village. Tegonteon is an islet, with a small village on it, lying on a projecting part of the coastal reef about midway between Ondolean village and Tanjong Rata.

A white iron beacon, surmounted by a ball, stands on the south-western extremity of a reef, which dries, about 8½ miles southward of Tanjong Rata (*Lat. 1° 37′ S., Long. 122° 05′ E.*).

Dongi village is situated near the mouth of a small river flowing out close northward of Tanjong Dongi, a low point about 10½ miles east-north-eastward of Tanjong Rata; the village is not visible from seaward, but the roof of a shed about one mile north-eastward of the mouth of the river can be seen. Anchorage can be obtained by vessels with local knowledge, in depths of from 10 to 12 fathoms ($18^{m}3$ to $21^{m}9$), off the mouth of the river and about half a mile offshore; a black beacon, surmounted by a cone, stands on the northern extremity of a reef lying nearly 2¼ miles eastward of Tanjong Dongi.

Charts 3240, 3616, 942a, 1263, 2759a.

Chart 3240.

None of the villages along the coast between Tanjong Bea and Tanjong Menahakeh is of much importance to shipping, and the numerous reefs within the 100-fathom ($182^{m}9$) line demand the utmost caution from vessels navigating in this vicinity; the water is, however, clear, and the reefs are usually plainly marked by discoloration. At Tanjong Menahakeh (*Lat. 1° 29′ S., Long. 122° 24′ E.*) the 100-fathom ($182^{m}9$) line approaches close to the coast.

STRAAT PELENG AND APPROACHES.—Dangers.—Straat Peleng, separating the island Peleng from the north-eastern end of Celebes, is deep, almost entirely free from dangers, and is the usual passage taken by vessels proceeding to Golf van Tomini from southward. The tidal streams set northward and eastward or southward and westward, the former, with a maximum rate of from 2 to 3 knots, being much the stronger; in the north-eastern entrance the tidal streams may attain a rate of 4 knots under the Peleng shore.

Thames reef lies nearly in the middle of the southern entrance to Straat Peleng, and is an atoll-shaped reef, which partly dries, rising steeply from a considerable depth; when covered it can easily be seen by its light green colour and surf. Lesampoeang is a prominent islet about 6½ miles north-eastward of Thames reef, and is separated from the reef extending north-westward from Peposso, the largest islet of the group of wooded uninhabited islets, known as Pulau Banjak, by a deep channel about one mile wide. Makailoe or Sengkelong, about 9 miles northward of Lesampoeang, and about 3¼ miles from the western side of Peleng, is partly wooded with tall trees, and lies on the northern side of a reef which dries.

Western and northern sides of Straat Peleng.—Coast.—The east coast of Celebes, forming the western side of Straat Peleng, is low in the southern part between Tanjong Menahakeh and Tanjong Batoe, 15½ miles north-eastward, and is then high between the latter point and Tanjong Toewis, about 22 miles farther north-eastward. There are several villages along this part of the coast, and anchorage can be obtained by vessels with local knowledge off them as follows:—off Loek village, situated in a small bay about one mile north-westward of Tanjong Batoei, in a depth of 24 fathoms ($43^{m}9$), about 1½ cables south-eastward of the village; Sungei Batoei flows out close northward of Tanjong Batoei, but is practically inaccessible.

Chart 2718, plan of Tangkiang road.

There is anchorage southward of Tangkiang village, situated about 6 miles north-eastward of Loek, in a depth of 25 fathoms ($45^{m}7$), about one cable offshore.

Chart 2718, plan of Kintong road.

Kintong village, about 3½ miles north-north-eastward of Tangkiang, can be easily identified by a noticeable cleft in the mountains behind the village, and some light green patches on the slopes: anchorage can be obtained off Kintong, in a depth of 25 fathoms ($45^{m}7$), about 1½ cables offshore.

Chart 3240.

Mondono village, about 3 miles eastward of Kintong, stands partly on the coast close eastward of the mouth of Sungei Mondono, and partly on a plateau, which can be identified by light green patches and a round-topped tree; anchorage can be obtained by vessels with

Chart 3240.

local knowledge, in a depth of 22 fathoms ($40^{m}2$), south-westward of this tree and about 2 cables offshore.

Chart 2718, plan of Luwuk road.

Reede Loewoek.—Between Tanjong Toewis (*Lat. 1° 00′ S., Long. 122° 48′ E.*) and Tanjong Biak, about 7½ miles north-eastward, the coast forms a bight, at the head of which there is an inlet named Lalong, entered by a narrow passage and only accessible for boats. Loewoek (Luwuk) village, the most important trading place for copra and forest produce on the east coast of Celebes, is situated on the northern shore of Lalong, and is the headquarters of a Government official; there is a landing pier at the eastern end of the village. Immediately northward of the entrance is another village, in the middle of which there is a large prominent tree.

Reede Loewoek (Luwuk) should be approached with the middle of a cleft in the mountains behind the village, bearing 315°. Good anchorage may be obtained on this bearing about 2¾ cables offshore, in a depth of 25 fathoms ($45^{m}7$). If other vessels are already in the roadstead it is advisable to anchor farther north-eastward, as the bottom near Tanjong Toemboek (Tumbuk), on the other side, is very steep. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3240.

A bank, with a depth of 20 fathoms ($36^{m}6$) over it, was reported, in 1945, to lie about 1½ miles south-eastward of Tanjong Toemboek.

Chart 2718, plan of Arjuno bay.

Coast.—Ardjoeno (Arjuno) baai, entered about 15 miles east-north-eastward of Loewoek, extends about 2¼ miles northward, with numerous inlets in the mangrove covered shores. The entrance is almost closed by a reef, on which are four islets, leaving a narrow but deep passage on either side. The bay affords good anchorage to vessels with local knowledge, and there is deep water practically throughout. It is visited by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 2195, plan of Telok Lamala.

Telok Lamala.—Dangers.—Telok Lamala, entered about 2½ miles eastward of Ardjoeno baai, has low shores. A reef, with a depth of one fathom ($1^{m}8$) over it, lies nearly in the middle of the entrance and is scarcely marked by discoloration. A reef, which dries, and which is usually marked by stakes and discoloration, lies about 8 cables north-westward of the eastern entrance point of the bay, and three reefs, which dry, lie about 1½ miles northward of the western entrance point. Besama village, on the north-eastern side of the bay, about 2¼ miles northward of the eastern entrance point, is a trading place for forest produce. There is a prominent tree on the eastern side of the head of the bay, which is a useful mark when entering.

Nonapetong baai is an inlet in the south-eastern part of Telok Lamala; Basoem (Basum) Pelau, a low, marshy islet with a reef extending from its northern and western sides, lies off the entrance to the bay. A reef, which dries, usually marked by stakes and by discoloration, lies about half a mile west-south-westward of Basoem Pelau, and a rock, with a depth of one fathom ($1^{m}8$) over it, lies about 6½ cables south-westward of the same islet. Bone Babakal village stands on the mainland southward of Basoem Pelau, and there are numerous coconut trees here. There is anchorage north-eastward of Basoem Pelau, in

Charts 942a, 1263, 2759a.

Chart 2195, plan of Telok Lamala.

a depth of about 16 fathoms ($29^{m}3$), close off the mouth of a rivulet. This anchorage is reached by passing southward and eastward of Basoem Pelau; a high, noticeable tree on the mainland eastward of this islet is a useful mark.

Chart 3240.

Coast.—Anchorages.—Tanjong Dongolalo (*Lat.* 0° *57′ S., Long.* 123° *24′ E.*), about 7½ miles north-eastward of Tanjong Botok, which lies about 14 miles south-eastward of Telok Lamala, is a high steep point. Telok Pojang, a bight immediately northward of Tanjong Dongolalo, affords anchorage to vessels with local knowledge, 2¾ cables offshore, in depths of from 8 to 11 fathoms ($14^{m}6$ to $20^{m}1$).

Chart 2718, plan of Belanta road.

Belanta village is situated nearly 5 miles northward of Tanjong Dongolalo and close south-westward of a bluff point fringed by a reef; anchorage can be obtained southward of this point, in depths of from 11 to 16 fathoms ($20^{m}1$ to $29^{m}3$), mud and sand, but with winds from seaward there is frequently a long swell here, rendering landing impracticable. There are some noticeable white rocks about half a mile southward of the village, and a peak (chart 3240), 2,697 feet ($822^{m}0$) high, densely wooded and with some light green patches on it, lies about 2½ miles northward of the village.

Chart 3240.

Pulau Doea are two islets, the larger and higher of which lies about 6 cables north-eastward of a point situated about 4 miles north-eastward of Belanta village; this islet is 325 feet ($99^{m}1$) high, and has a small sandy beach on its northern side, with a fresh-water lake behind, and a reef, which partly dries, lies fully 2 cables off the north coast. There is usually a strong current between these islets and the coast.

Tanjong Talaboe, about 3 miles northward of Pulau Doea, and Tanjong Pangkalsiang, about 4 miles farther northward, rise perpendicularly from the sea. Two reefs, which dry, named Batu Tetèk, lie about half a mile northward of Tanjong Talaboe and within three-quarters of a mile of the coast; the breakers over them can be seen from a great distance.

Eastern and southern sides of Straat Peleng.—Anchorages.—The eastern and southern sides of Straat Peleng are formed by the west and north coasts, respectively, of the island Peleng; the land within these coasts is mountainous, but the summits in the southern part are difficult to identify. Tanjong Kembani, the south-western extremity of Peleng, rises gradually to the mountains within; several reefs lie within the 100-fathom ($182^{m}9$) line southward and south-westward of this point. The southern part of the west coast of Peleng, for a distance of about 12 miles north-north-westward of Tanjong Kembani, is fringed by a number of islets and reefs; Daloppo, about 2 miles westward of Tanjong Kembani, is a low islet wooded with high trees. The channels within these islets are navigable by vessels with local knowledge when the reefs are plainly visible.

Tanjong Batoe Poetih, the north-western extremity of Peleng, is a steep point with two white rocky patches on it. Tanjong Pemali, the north-eastern extremity of Peleng, rises almost perpendicularly from the sea, and may be identified by a large rock above water. The northern coast of Peleng is very steep outside the bays and should not

Charts 942a, 1263, 2759a.

Chart 3240.

be too closely approached in view of the remarks concerning the tidal streams given on page 548.

Baai van Bolonan, entered 12 miles eastward of Tanjong Batoe Poetih, affords anchorage to vessels with local knowledge close under the western shore near a reef, which dries, at the head of the bay.

Chart 2195, plan of Bangkalan bay.

Bangkalan baai, entered about 2 miles eastward of Baai van Bolonan, lies in the middle of the northern side of Peleng, and affords good anchorage throughout. Noord Bangkalan (*Lat. 1° 10′ S., Long. 123° 17′ E.*) and Zuid Bangkalan are two densely wooded islands lying in the entrance. Noord Bangkalan is rocky and moderately high, whilst Zuid Bangkalan is low and flat. The channel between these two islands is deep and clear, but is not recommended on account of the strong current. The passage eastward or westward of Zuid Bangkalan is clear of dangers; a 6½-fathom ($11^{m}9$) patch in the northern part of the eastern passage is usually marked by discoloration and tide-rips. Banjak (Banyak) eilanden lie near the south-western shore of the bay, and some detached reefs lie within one mile north-eastward of them. On the eastern shore, southward of Bangkalan, are the two large villages Bonganang and Lamoboeang (Lamobuang), partly built on the coastal reef. Tinangkong, a dome-shaped mountain, 1,496 feet ($456^{m}0$) high, lies at the head of the bay, and a prominent conical peak, 1,831 feet ($558^{m}1$) high, lies nearly 7 miles north-eastward of Tinangkong.

Chart 2195, plan of Lelomping bay.

Lelomping baai, close eastward of Bangkalan baai, affords good anchorage, except with northerly winds, in depths of from 8 to 9 fathoms ($14^{m}6$ to $16^{m}5$), about 6½ cables east-north-eastward of the northern of two rocky islets at the head of the bay; southward of this position the depths decrease fairly rapidly. The bay can be entered by steering for the scattered houses of Loewoeksago (Luwuksago) village, at the head of the bay. Pondi Pondi, a small islet off the western entrance point of Lelomping baai, is very conspicuous.

The bank, with a least depth of 6 fathoms ($11^{m}0$) over it, lying about one mile northward of Pondi Pondi, can always be distinguished on account of its light-green discoloration and often by tide-rips.

Chart 3240.

BANGGAI ARCHIPEL.—Banggai archipel includes Peleng and a number of islands lying southward and south-eastward. The inhabitants may be divided into two groups: those who dwell on the coasts are a mixed race from Ternate, Ceram, and other islands, who have settled in the archipelago at various times and exist by trade and fishing; the mountain dwellers, especially on Peleng, are a primitive race who avoid contact with the coastal dwellers as much as possible. The islands produce good timber, including a large quantity of ebony.

Peleng.—Peleng, the northernmost and largest island of the archipelago, is mountainous and thickly wooded; Bangkalan, Peleng, and Mesamat baaien nearly divide the island into three parts. The west and north coasts of this island are described with Straat Peleng on pages 548-549. *See* view facing page 543.

Southern and eastern sides of Peleng.—Dangers.—Peleng baai, entered between Tanjong Kembani (page 550) and Tanjong Patipa-

Charts 3616, 942a, 1263, 2759a.

Chart 3240.

kaman (*Lat. 1° 36′ S., Long. 123° 06′ E.*), about 13 miles eastward, is free from dangers in the fairway northward of the line joining these two points, and the depths are fairly regular. Several reefs lie just within the 100-fathom (182^{m}9) line off the entrance, but as these are plainly marked by discoloration the bay is comparatively easy to enter. The most important of these reefs are: a reef, with a least depth of 3 feet (0^{m}9) over it, lying about 2 miles south-eastward of Tanjong Kembani; Malappatia, a reef which dries, about 4 miles east-south-eastward of the same point; a horseshoe-shaped reef, which dries, lying with its northern extremity about 4½ miles south-south-westward of Tanjong Patipakaman. A reef, with some rocky islets on it, extends about one mile southward from Tanjong Patipakaman; two summits within this point, 1,112 and 1,517 feet (338^{m}9 and 462^{m}4) high, respectively, are prominent.

A reef, marked by discoloration, and which breaks heavily, lies about 2 miles from the western shore, about 8½ miles east-north-eastward of Tanjong Kembani. A reef, with a depth of 5 feet (1^{m}5) over it, lies about 1½ miles from the eastern shore, about 7½ miles north-north-eastward of Tanjong Patipakaman. There are several other reefs close offshore on both sides of the bay. Tetapen, an islet, 351 feet (107^{m}0) high, on the western side of the head of the bay, is prominent. A reef lies about one mile southward of Tetapen and the same distance off the western shore of the bay; a 2-foot (0^{m}6) patch lies about 1½ miles south-eastward of Tetapen and one mile off the eastern shore. There are several villages along the shores of the bay; those in the northern part are situated on high land and are visible for a considerable distance. Lolantang, the principal village, lies in a small inlet, accessible for small craft, on the western shore of the bay, but it is not easily seen from seaward. A road, which practically encircles the whole island, runs along the shores of Peleng baai.

Bobo, a rocky islet, covered with high trees, lying about 7 cables offshore, about 4¾ miles south-eastward of Tanjong Patipakaman, is prominent, as is also the hill, 1,002 feet (306^{m}0) high, 2 miles northward of the south-western entrance point of Mesamat baai, about 5 miles eastward of Bobo.

Mesamat baai, eastward of Peleng baai and separated from it by a hilly peninsula, is foul in the north-eastern part, but the western side is clear of dangers except in the northern part. The drying parts along the western and northern sides are marked by discoloration.

Anchorage can be obtained by vessels with local knowledge off the villages Liang, Apal, and Paisoeloenoe, all situated on the western shore. Liang, the principal of these, is situated 5½ miles northward of the south-western entrance point on the shore of a small inlet enclosed by a reef, inside which the depths increase again; the village is reached over a bamboo pier built out between houses standing in the water, and the place is occasionally visited by vessels of the Koninklijke Paketvaart Maatschappij. Apal village is situated about 5 miles northward of Liang, and Paisoeloenoe is at the head of the bay about 3½ miles north-north-eastward of Apal.

The east coast of Peleng is free from dangers; a rocky islet off Sambioet village, situated about 7½ miles southward of Tanjong Pemali (page 550) is prominent. Sambioet and Kamotokan, a village about 3 miles northward, are both visible from seaward; good anchor-

Charts 3616, 942a, 1263, 2759a.

Chart 3240.

age can be obtained by vessels with local knowledge off Sambioet, out of the influence of the strong tidal stream from Straat Kaloembangan, in a depth of 20 fathoms (36^{m}6), with the rocky islet off the village, bearing 025°, and the northernmost of the rocks northward of Potil kechil, an islet nearly 4 miles south-south-eastward of Sambioet, bearing 148°.

Charts 3240, 3241.

Straat Kaloembangan.—Straat Kaloembangan, separating Banggai from the south-eastern part of Peleng, is the most serviceable route for vessels proceeding from the Molucca sea to Baai van Banggai, on the west coast of Banggai; a strong tidal stream, however, runs through this strait, attaining a rate of from 4 to 7 knots. Kaloembangan village, about 5½ miles south-westward of Sambioet, stands on the coastal reef which fills an inlet on the Peleng side of the strait; a small islet or sandbank, with a couple of trees on it, lies on the edge of this coastal reef, and is used as a burial place and a building place for praus.

Potil besar (*Lat. 1° 29′ S., Long. 123° 34′ E.*), an island close eastward of the northern end of Banggai, has a very noticeable sharp summit, 434 feet (132^{m}3) high, which affords a useful landmark for vessels approaching Straat Kaloembangan from the Molucca sea; the remainder of this island is low, and its coast is rocky. Potil kechil, close off its northern side, is similar. Several rocks above water lie within a distance of one mile northward of Potil kechil.

Western and southern sides of Banggai.—Danger.—The west coast of Banggai is low. The two low Bandang eilanden are separated from the southern part of this coast by a channel, clear of dangers about one mile wide. There is a noticeable tree on the south-western side of Banggai, eastward of Bandang eilanden. Kenaoe, a hilly island, is separated from the south coast by a deep but narrow passage. A shoal, with a least depth of 2¾ fathoms (5^{m}0) over it, lies about one mile southward of Kenaoe.

Chart 2195, plan of Banggai bay and approaches.

Baai van Banggai.—Light.—Danger.—Baai van Banggai, entered about 7½ miles south-south-westward of the northern extremity of Banggai, affords good anchorage at all times. Banggai, the principal settlement of the archipelago, and the residence of a native prince, stands at the head of the bay. Owing to the unhealthy climate the Government official resides at Loewoek (page 549). A mosque with a high roof at Banggai is very prominent. A brisk native trade is carried on with Gorontalo and Ternate. There is a landing pier where boats can lie alongside at low water.

A light is exhibited, at an elevation of 13 feet (4^{m}0), from a post on the head of the pier.

Bakakang eilanden consist of two low islands lying close together on a reef about 1¼ miles westward of the northern entrance point of Baai van Banggai. A 23-foot (7^{m}0) patch (chart 3240) lies about 2¼ miles south-westward of the southern of the Bakakang eilanden. To-oelon (To-ulon) kechil lies about 6½ cables north-eastward of the northern of the Bakakang eilanden, and To-oelon (To-ulon) besar lies close northward of To-oelon kechil. The narrow passage between To-oelon besar and the Banggai coast has a least depth of 6 fathoms (11^{m}0) in the fairway and is navigable, although the tidal streams are strong.

Charts 3616, 942a, 1263, 2759a.

Chart 2195, plan of Banggai bay and approaches.

There is a clear passage on either side of To-oelon kechil, and also on either side of the reef lying southward of it; vessels proceeding to Banggai from Straat Kaloembangan, however, usually pass westward of To-oelon eilanden and thence between Bakakang eilanden and the 23-foot (7^{m}0) patch south-westward of them.

The roadstead, which lies within the arc of a circle drawn from the flagstaff at Banggai, with a radius of 4,593 feet (1,400^{m}0), is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Vessels bound for Baai van Banggai from westward can proceed through the channel northward of Bangkoeloe and Labobo (*see* below).

Charts 3240, 3241.

Eastern side of Banggai.—The east coast of Banggai, northward of Tanjong Ballast, the south-eastern extremity of the island, is high and rocky. Lambako baai lies on the western side of Tanjong Bandana Olipatan (*Lat. 1° 35′ S., Long. 123° 36′ E.*), a point lying about the middle of the east coast, and affords sheltered anchorage to vessels with local knowledge during the South-east monsoon, in a depth of about 22 fathoms (40^{m}2), in the southern part of the bay; at the head of this bay is a steep sandy beach, through which some clear streams flow into the sea, and on the eastern side is an inlet with high, steep shores, only available for praus on account of a reef off the entrance.

Chart 3240.

Labobo and Bangkoeloe.—These two wooded islands lie about 5½ and 21 miles, respectively, west-south-westward of the south-western side of Banggai. The northern part of Labobo rises to an elevation of about 820 feet (249^{m}9), and the summit of Bangkoeloe, in about the middle of the island, is 2,271 feet (692^{m}2) high. Labobo kechil, close off the south-western extremity of Labobo, and Togong Lantang, about 3¾ miles westward of Labobo kechil, are low, wooded islets. Two shoals, with depths of 29 and 23 feet (8^{m}8 and 7^{m}0) over them, lie about 2 miles north-eastward and 2¾ miles north-north-eastward, respectively, of Togong Lantang.

Channel northward of Bangkoeloe and Labobo.—Approaching this channel from westward, a vessel should pass between the north-western extremity of Bangkoeloe and the large horseshoe-shaped reef, which dries, lying about 2½ miles north-westward. Bongko, a low, wooded islet, about 2 miles north-north-eastward of the northern extremity of Bangkoeloe and fringed by a reef, plainly marked by discoloration, is easily identified; the passage southward of this islet is preferable, as a reef, with a least depth of 2 fathoms (3^{m}7) over it, extends nearly 2¾ miles northward. Thence the vessel should proceed through the wide clear channel between Labobo and Peleng, noting that a 36-foot (11^{m}0) patch lies about 6 miles eastward of Bongko. A vessel bound for Baai van Banggai should take care to avoid the 23-foot (7^{m}0) patch lying about 2¼ miles south-westward of Bakakang eilanden.

Islands and reefs southward of Bangkoeloe and Labobo.—In the south-western corner of Banggai archipel are a number of islands and reefs, and through these are clear channels easily navigated by vessels with local knowledge. Sago, the south-western island of the archipelago, lies about 17 miles south-south-eastward of Bangkoeloe and is low, except in the north-eastern part, where there is a prominent hill, 428 feet (130^{m}4) high; the island is fringed by an extensive reef,

Charts 3616, 942a, 1263, 2759a.

Chart 3240.

which dries, well marked by discoloration when covered, and there are some islets on the southern part. Vesuvius, a reef, which dries, and the westernmost danger of Banggai archipel, lies about 16 miles west-north-westward of Sago; there are two large reefs, which dry, about 2 miles south-eastward and 8½ miles east-north-eastward, respectively, of Vesuvius, and all three reefs are plainly marked by discoloration when covered.

Maringki (*Lat. 2° 09′ S., Long. 123° 11′ E.*), a small islet about 3 miles north-north-eastward of Sago, is situated near the south-western end of an extensive bank with many shoal heads on it, and separated from the reef fringing Sago by a deep passage, clear of dangers, about one mile wide; on the western edge of this bank are the islets Togo Pilogo, about 4 miles north-north-eastward of Maringki, Salokka, and Kalo, about 6½ and 10 miles, respectively, farther northward, and on the eastern edge are Siloemba eilanden. Close westward of the northern part of this bank is another bank, on which is an islet named Panteh; the passage between these two banks is easily navigated by vessels with local knowledge, but care should be taken to avoid a small reef, which dries, marked by discoloration, lying on the former bank about one mile south-westward of Salokka. There is also a navigable passage westward of Panteh, passing between this islet and Boendoe, nearly 3 miles north-westward, and thence south-eastward of Sidoela, an islet about 2 miles north-north-eastward of Boendoe. After passing through these passages vessels can proceed either northward or southward of Bangko, an island lying about 7 miles south-eastward of the south-western extremity of Labobo, according to their destination. All the islets in this part of the archipelago are low, but wooded, and afford excellent landmarks.

There is also a passage between Siloemba eilanden and a large reef, lying with its northern extremity about 7 miles eastward of the southern Siloemba eiland; thence passing along the western side of a horseshoe-shaped reef lying about 6 miles north-eastward of the northern Siloemba eiland. A shoal, with a depth of 29 feet ($8^{m}8$) over it, lies about 4 miles north-north-eastward of the northern extremity of the horseshoe-shaped reef.

Charts 3240, 3241.

Trèko eilanden lie about 10 miles north-eastward of Siloemba eilanden; Telopo Paoen (Paun), the southern island, has a ridge, 191 feet ($58^{m}2$) high, in its northern part, and there are some islets under formation off its eastern side; the northern island of the group is low and wooded.

Toembak (Tumbak) eilanden lie about 3¾ miles north-eastward of Telopo Paoen; the western island has an elevated part at its southern end, 180 feet ($54^{m}9$) high, wooded with high trees. There are navigable channels between Trèko and Toembak eilanden.

Islands and reefs in the south-eastern part of Banggai archipel.—The islands Poposon, Pobongkoli, Togong Bojoko (Boyoko), Sabor, and Leelang (Lelang) lie on extensive reefs just within the 100-fathom ($182^{m}9$) line south-eastward of Trèko eilanden; Kenetjil (Kenechil) lies nearly 3 miles north-eastward of Poposon. All these islands are low and wooded, with sandy beaches, but, owing to the numerous shoals, this vicinity should be avoided.

Telopo, Kokoedan (Kokudan), Kembongan, and Melilis lie close

Charts 3616, 942a, 1263, 2759a.

Charts 3240, 3241.

together in a group about 11 miles northward of Leelang, and are all about 500 feet (152m4) high; some reefs, with depths of from one foot to 13 feet (0m3 to 4m0) over them, lie within one mile of the south-western extremity of Telopo. The channels eastward of Telopo and westward of Melilis are safe and easy to navigate. Strong tidal streams set through the passages between these islands, but their influence does not extend far outside them.

A shoal, with a depth of 23 feet (7m0) over it, lies 4 miles north-north-westward of Telopo.

Masépé, about 3¼ miles south-south-eastward of Melilis, rises steeply from the sea to an elevation of 496 feet (151m2), but has no conspicuous summit. Boleh, a low island covered with coconut plantations, is separated from the west coast of Masépé by a narrow passage with a least depth of 39 feet (11m9). Tanalan Paoen lies about 1½ miles south-westward of the southern extremity of Masépé, with a clear passage between, except for a 21-foot (6m4) patch lying about three-quarters of a mile north-north-westward of Tanalan Paoen (*Lat. 2° 05′ S., Long. 123° 45′ E.*). Tanalan lies close southward of Tanalan Paoen, and the passage between should not be attempted. Sidoe lies about 2½ miles eastward of Tanalan, and the space between is almost entirely filled with reefs.

Groot Saloeë (Salüe), about 1½ miles north-eastward of Masépé, and Klein Saloeë (Salüe), close southward of Groot Saloeë, appear as a ridge of mountains, with sharply defined summits when seen from eastward or westward; the highest peak of Groot Saloeë has an elevation of 1,520 feet (463m3), and that of Klein Saloeë, 1,018 feet (310m3). Belangan lies about 8 cables westward of the northern extremity of Groot Saloeë and rises steeply from the sea on all sides to an elevation of 542 feet (165m2). A 10-foot (3m0) patch lies close off the southern side of Belangan. A steep, rocky, wooded islet lies close offshore about one mile south-eastward of the northern extremity of Groot Saloeë.

The strait between Masépé and Groot Saloeë is easy to navigate by vessels with local knowledge, but care should be taken to avoid a 17-foot (5m2) patch lying near the middle of the northern entrance. Boegin (Bugin), a village on the Groot Saloeë shore of the strait, is the headquarters of a district chief.

The strait between Groot Saloeë and Klein Saloeë is deep and navigable, although in the narrowest part, which is barely one cable wide, there is often a strong tidal stream. A low, wooded islet, fringed by an extensive reef, which dries, having an isolated tree on the southern part, lies off the eastern entrance. Vessels passing through the strait should hold the steep, rocky shore of Groot Saloeë throughout; the north-western extremity of Sidoe, seen in the middle of the opening in the strait, bearing 208°, leads clear north-westward of the coastal reef fringing the islet off the eastern entrance.

Bone Beloesan village is situated on the south-west coast of Klein Saloeë, and south-eastward of it is a small bay entirely closed by a reef, which dries. Loisa or Boi, and several other islets, lie on an extensive reef close southward of Klein Saloeë; these islets are covered with mangroves and are increasing in size and number. The channel between this reef and Klein Saloeë is narrow, but is navigable by vessels with local knowledge.

Charts 942a, 1263, 2759a.

Charts 3240, 3241.

Greyhound strait.—Greyhound strait lies along the eastern side of Banggai archipel, and separates the sunken plateau on which this archipelago lies from that on which Soela eilanden lie. The current, chiefly caused by currents in Banda and Molucca seas, sets through the strait in a general north-north-west or south-south-east direction, according to the monsoon, and may attain a rate of from 2 to 3 knots. *See* views facing this page.

The strait is deep and clear of dangers in the fairway. In the northern part, eastward of Banggai, it is divided into two arms by a long, narrow bank, with a least depth of 6 fathoms (11^{m}0), trending in a north and south direction; the shoalest spot on this bank lies about 13½ miles east-north-eastward of Tanjong Bandana Olipatan (page 554). About midway between the northern end of this bank and the northern end of Banggai is a small shoal, with a depth of 7 fathoms (12^{m}8) over it.

The east coasts of Banggai and Peleng, forming the western side of Greyhound strait, are described on pages 554 and 552, respectively.

Eastern side of Greyhound strait.—Danger.—Tempau, about 11 miles north-eastward of Groot Saloeë, is a wooded island rising to an elevation of 467 feet (142^{m}3) in about the middle; on the northern extremity of the island is an isolated hillock, 289 feet (88^{m}1) high; the southern part of the island is considerably lower and has a sandy coast. Timpaoes (Timpaus) village (*Lat. 1° 50′ S., Long. 124° 00′ E.*) is partly built on piles on the broad coastal reef extending from the northern part of the west coast; there is another village, only occasionally inhabited, on the reef extending from the southern part of the east coast. In the northern part of the east coast is a small bay encumbered by a reef and islets covered with mangroves; some rocks lie close to the coast northward of this bay. There are coconut plantations along the entire coast.

A ridge, with depths of less than 10 fathoms (18^{m}3) over it, extends about 10 miles south-south-eastward from the southern extremity of Tempau; on this ridge, and nearly 6 miles southward of Tempau, are some patches with a least depth of 13 feet (4^{m}0) over them. Vessels crossing this ridge should keep about 1½ miles southward of the southern extremity of Tempau, where there is a least depth of 46 feet (14^{m}0). A small bank, with a least depth of 52 feet (15^{m}8) over it, lies about 8½ miles north-north-westward of Tempau.

The western part of Taliaboe (page 558), seen from Greyhound strait, appears as a high tableland without any noticeable features. Sekoe and Kano (page 558), two islands close off the south-western extremity of Taliaboe, are useful marks when approaching the strait from southward.

Chart 3241.

SOELA EILANDEN.—Soela (Sula) eilanden, separated from Banggai archipel by Greyhound strait, comprise the three main islands Taliaboe, Mangoli, and Sanana, with a number of smaller islands. The sunken plateau on which this group lies generally runs fairly close along the coasts of the main islands, except at the western end, where it extends as far westward as Greyhound strait and includes Tempau and several other islands. Taliaboe, Mangoli, and Sanana are mountainous, and at present little is known of the interior of these islands.

Charts 942a, 1263, 2759a.

Chart 3241.

There is a considerable amount of game on Taliaboe and Mangoli; the cultivation of coconut plantations is carried out on Sanana.

Taliaboe, with Straat Tjapaloeloe, is the only portion of the group described in this volume; the remainder is described in Eastern Archipelago Pilot, Vol. III.

Charts 3240, 3241.

Islands and dangers off western end of Taliaboe.—Masoni is a low island lying about 8½ miles north-eastward of Tempau, with a clear passage between. Limbo, about 6½ miles eastward of Masoni, has a hill in the middle, 300 feet (91^{m}4) high, and is the south-westernmost of a chain of islands lying on a ridge extending in a south-westerly direction from Tanjong Marikasoe (Marikasu), the north-western extremity of Taliaboe. The passage between Masoni and Limbo is unsafe, on account of a reef, with a least depth of 15 feet (4^{m}6) over it, about 2½ miles eastward of the eastern extremity of Masoni (*Lat. 1° 46′ S., Long. 124° 10′ E.*), and two 13-foot (4^{m}0) patches within 2½ miles of the southern extremity of Limbo; there is also a strong tidal stream off Limbo.

Chart 3241.

TALIABOE.—The whole of the western half of Taliaboe (Taliabu) is occupied by a high tableland, exceeding an elevation of 4,500 feet (1,371^{m}6) in parts, from which spurs descend steeply to the sea; there are no noticeable peaks in this part, and the summits shown on the chart are merely the highest parts of almost equally high land. The eastern part of Taliaboe consists of hilly land, rising steeply from the south coast.

West coast of Taliaboe.—The western part of Taliaboe, when seen from northward or southward, appears as a monotonous tableland, without any noticeable features with ridges descending gradually to the coast. A strong current, often exceeding a rate of 3 knots in the channel between the islands, is experienced off the west coast; this current is caused, to a great extent, by those in the Molucca and Banda seas, and how far it is affected by the tidal streams has not been determined, but the direction is either northward or southward.

Tanjong Marikasoe is a comparatively low, rocky point, bordered by a sandy beach, and is not very noticeable at a distance. The area between the coast southward of this point and the chain of islands extending about 10 miles south-westward has not been thoroughly examined and is unsafe.

Charts 3240, 3241.

Kramat, an islet lying close offshore about 15 miles southward of Tanjong Marikasoe, can be easily identified; a 19-foot (5^{m}8) patch lies about 2¾ miles north-north-westward of Kramat.

Chart 3241.

Sekoe and Kano.—Sekoe (Seku) and Kano are two islands lying close off the south-western extremity of Taliaboe; Sekoe, 1,658 feet (505^{m}4) high, has a conical shape, like a volcano, and is prominent. Kano, close south-eastward of Sekoe, is 716 feet (218^{m}2) high. The channel between these two islands is only navigable for small vessels with local knowledge when the current is not too strong, and when the edges of the reefs extending from each island are clearly visible. There is a small bay, entirely closed by reefs, on the western side of

Chart 3241.

Sekoe, and about 1¼ miles farther northward is another small bay, with a sandy beach. Some noticeable rocky islets lie close off the north-western extremity of this island, and an islet, 9 feet ($2^{m}7$) high, lies about a quarter of a mile offshore about one mile westward of the north-eastern extremity. Batu Andor, a rock above water, lies about 3½ cables south-eastward of the southern extremity of Kano.

Straat Boki.—Dangers.—Directions.—The channel between Sekoe and Taliaboe is clear of dangers except for a 17-foot ($5^{m}2$) patch in the northern entrance and a 13-foot ($4^{m}0$) patch in the southern part. This channel leads from northward to Straat Boki, the passage, which is clear of dangers, between Kano and Tanjong Merah, the precipitous brownish south-western extremity of Taliaboe.

Straat Boki is navigable for vessels of moderate size with local knowledge, although a strong current sometimes runs through.

A vessel approaching Straat Boki from eastward will soon identify Tanjong Merah, and can enter by keeping this point in line with the summit of Sekoe, bearing about 299° ; when she is within one cable of the point she can proceed through the strait, keeping about one cable from the Taliaboe shore. The above alignment leads close to a shoal, with a depth of 23 feet ($7^{m}0$) over it, lying off the reef extending from the north-eastern side of Kano, so that when nearing this shoal the vessel should keep slightly north-eastward of the alignment. A white sandbank, which only covers at high water, lies on the reef extending from the north-eastern side of Kano.

South coast of Taliaboe.—Islets and dangers.—As the depths permit a vessel to approach close to the south coast almost everywhere, the various points of land can be readily identified. There is a considerable sea off this coast during the South-east monsoon, but under favourable conditions of weather anchorage can be obtained by vessels with local knowledge almost everywhere.

Tanjong Bo (*Lat. 2° 02′ S., Long. 124° 29′ E.*), nearly 5 miles eastward of Tanjong Merah, is a rocky point of a reddish-brown colour. The depths off the coast between these two points are very irregular ; Batu Tiga, lying on a coral reef, which dries, about half a mile offshore and 2 miles west-south-westward of Tanjong Bo, consists of three large rocks covered with shrubs and a much lower, bare rock between them.

Kawaloe (Kawalu) is a fairly large village situated about 4 miles eastward of Tanjong Bo, and is the residence of a native district chief ; behind this village is a large lagoon, named Likitobi, but it is of no importance to shipping. A noticeable hill about 1½ miles westward of Kawaloe can be easily identified, as there are some reddish patches of rock on it ; the land on either side of this hill is low and covered with coconut plantations.

Tanjong Wojo (Woyo) lies about 8½ miles east-north-eastward of Kawaloe, and just within this point is a hill, 569 feet ($173^{m}4$) high ; Wojo, an islet about 65 feet ($19^{m}8$) high and covered with low trees, lies near the coast about one mile eastward of Tanjong Wojo, and is a good landmark from both eastward and westward. Anchorage can be obtained by vessels with local knowledge, in a depth of 16 fathoms ($29^{m}3$), in the bight immediately north-eastward of Wojo, but care should be taken to avoid a 16-foot ($4^{m}9$) patch lying about 7½ cables east-north-eastward of the islet, and a 13-foot ($4^{m}0$) patch about 5 cables north-north-eastward of the islet. Wajkilo (Waykilo) village,

Charts 942a, 1263, 2759a.

Chart 3241.

nearly 3 miles north-eastward of Tanjong Wojo, and Pihingtjado (Pihingchado) village, about 4½ miles farther north-eastward, are situated in the midst of extensive coconut plantations; Wai Miha flows through a low, muddy point between these two villages. There is a low strip of land, with hills behind, along the entire shore of the bight between Tanjong Wojo and Tanjong Pastoeri (Pasturi), about 13 miles eastward; the shore is bordered by a sandy beach, only interrupted in places, during the rainy season, by a few rivulets.

Between Tanjong Pastoeri and Tanjong Kona, a prominent rocky point, about 7½ miles eastward, the hills approach nearer the coast. Sofan village, about midway between these two points, is the headquarters of a native district chief; anchorage can be obtained off this village by vessels with local knowledge, in a depth of 5 fathoms ($9^{m}1$), fairly close offshore. Kawada village stands at the head of a small bay, affording good anchorage to vessels with local knowledge, in a depth of 3¾ fathoms ($6^{m}9$), immediately westward of Tanjong Kona.

Between Tanjong Kona and Tanjong Kasika, a prominent rocky point about 6 miles east-north-eastward, the coast forms a sandy bay, the shore of which is bordered by a dark sandy beach, with coconut plantations within. Mantarara village is situated at the head of this bay. Close within Tanjong Kasika is a fairly prominent hill, 1,156 feet ($352^{m}3$) high; there is also a prominent hill, 792 feet ($241^{m}4$) high, close within Tanjong Hokoe (Hoku), about 5½ miles eastward of Tanjong Kasika. Wajkadai (Waykadai) village stands on the shore of the bight between these two points; there is a sandy beach here, with coconut trees.

Tanjong Ndoloedeoe (Ndoludeu), the south-eastern point of Taliaboe, is low and sandy, with hills rising close within; close northward of this point is a noticeable rocky patch on the coast.

North coast of Taliaboe.—Off the greater part of the north coast of Taliaboe the 100-fathom ($182^{m}9$) line lies some distance from the coast, and the depths within this line are very irregular, with a number of shoal heads and a few islets; unless necessary, therefore, passing vessels should keep outside the 100-fathom ($182^{m}9$) line. A current setting either eastward or westward may be expected.

The coast between Tanjong Marikasoe (page 558) and Tanjong Laoe (Lau), about 29 miles eastward, is of dune formation, more or less covered with vegetation and bordered by a sandy beach; except for Tanjong Haj (Hay) (*Lat. 1° 40′ S., Long. 124° 47′ E.*), about 5½ miles westward of Tanjong Laoe, the points are low and sandy. Anchorage can be obtained by vessels with local knowledge almost everywhere off this part of the coast during the South-east monsoon and in the transition periods, and the following anchorages may be mentioned: off Kafa village, about 4 miles eastward of Tanjong Marikasoe; in Djiko (Jiko) Bakiki, a narrow inlet immediately eastward of Tanjong Podoeng (Podung), a low, sandy point about 8 miles eastward of Tanjong Marikasoe; off Gela village, standing on the shore of a small bight on the western side of Tanjong Balinggolo, about 11 miles eastward of Tanjong Podoeng; and in the bay immediately eastward of Tanjong Haj, in the eastern part of which is Djoerdjoga (Jurjoga) village. The villages are not permanently occupied, but are only inhabited at times by a very primitive type of natives from the mountains.

Charts 942a, 1263, 2759a.

Chart 3241.

Off-lying islets and dangers.—Samada besar lies about 6 miles north-eastward of Tanjong Marikasoe, and is almost entirely fringed by a narrow reef; Samada kechil lies about 1½ miles southward of Samada besar, with a safe passage between, and is fringed by a narrow reef. These two islands can be identified from a great distance; Samada kechil is the higher of the two. There is also a safe passage between the latter and Taliaboe. A shoal, with a depth of 36 feet (11^{m}0) over it, lies about 3 miles north-westward of the northern extremity of Samada besar.

A shoal, with a depth of 27 feet (8^{m}2), rock and sand, over it, lies about 2 miles north-north-eastward of Tanjong Podoeng, and a shoal, with a depth of 19 feet (5^{m}8) over it, lies about 7 cables north-eastward of the same point. A shoal, with a depth of 36 feet (11^{m}0) over it, lies close within the 100-fathom (182^{m}9) line, about 5 miles north-eastward of the point.

Two shoals, with depths of 10 and 8 feet (3^{m}0 and 2^{m}4) over them, lie about three-quarters of a mile and 1¾ miles, respectively, east-north-eastward of Tanjong Noedoe, situated about 4¾ miles eastward of Tanjong Podoeng. A shoal, with a depth of 23 feet (7^{m}0) over it, lies about 3 miles north-eastward of Tanjong Noedoe. A reef, with a least depth of 2 feet (0^{m}6) over it, marked by light green discoloration and sometimes by a fishing stake, lies about 2½ miles northward of Tanjong Balinggolo. A reef, with a least depth of 15 feet (4^{m}6) over it, and a reef, with a depth of 42 feet (12^{m}8) over it, lie about 3 miles north-north-eastward and 2¾ miles north-eastward, respectively, of Tanjong Haj. A shoal, with a depth of 23 feet (7^{m}0) over it, lies about 2 miles north-north-westward of Tanjong Laoe.

Coast.—The north coast of Taliaboe between Tanjong Laoe and Tanjong Fatoekomboe (Fatukombu), about 28 miles eastward, is entirely different from that westward of Tanjong Laoe; it is indented by several bays, the most important being Djiko Doehoe (Jiko Duhu), Djiko (Jiko) Parigi, and Djiko Samoeja (Jiko Samuya), all in the eastern part of this coast. Anchorage may be obtained by vessels with local knowledge almost everywhere in the south monsoon, and Djiko Parigi and Djiko Samoeja also afford shelter in the north monsoon. Owing to the numerous spurs running down to the sea from the mountains and hills, the coast is tolerably high.

Off-lying islets and dangers.—Tonghaja (Tonghaya) group, about 1¼ miles north-north-eastward of Tanjong Laoe (*Lat. 1° 41′ S., Long. 124° 52′ E.*), consists of two coral islets, covered with vegetation, and fringed by a reef extending some distance from their northern sides. A reef, which dries, lies about 3½ cables southward of the western islet, and a shoal, with a depth of 23 feet (7^{m}0) over it, lies about 2¼ miles north-eastward of the eastern islet.

Tonga and Kabihoe (Kabihu) lie about 3 and 5¾ miles, respectively, eastward of Tonghaja, and are similar but larger islets. Two shoals, with depths of 18 and 29 feet (5^{m}5 and 8^{m}8) over them, respectively, lie about 1½ miles northward of Kabihoe. Gono, a coral islet, covered with vegetation, lies about one mile southward of Tonga, and Lake, a similar islet, lies on the reef extending from the main coast southward of Gono; Pasi Toeri (Turi), a sandbank with some shrubs on it, lies about 1½ miles eastward of Lake, and numerous reefs lie southward of Tongo and Kabihoe. In the south monsoon, however, when the reefs

Charts 942a, 1263, 2759a.

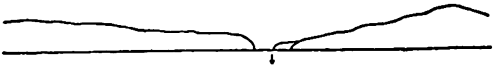
Chart 3241.

are usually plainly visible, the inshore passage, passing close northward of Gono, is practicable.

A shoal, with a depth of 7 feet ($2^{m}1$) over it, lies about 5 miles west-south-westward of Tanjong Pohonbatoe (Pohonbatu), the western entrance point of Djiko Doehoe. A 26-foot ($7^{m}9$) patch lies about 1¼ miles west-north-westward of the same point, and a reef, with a depth of 6 feet ($1^{m}8$) over it, lies off the entrance to Djiko Doehoe. The coast eastward to Tanjong Fatoekomboe appears to be clear of dangers.

Chart 3440, plan of Tjapaloeloe strait and Vesuvius bay.

STRAAT TJAPALOELOE.—Dangers.—Straat Tjapaloeloe, between Taliaboe and Mangoli, is a deep but narrow passage, and, notwithstanding the strong tidal streams, is navigable for large vessels. Tanjong Ndoloedeoe, on the western side of the southern entrance, is described on page 560; Tanjong Ndoloeselagi, about three-quarters of a mile north-eastward of Tanjong Ndoloedeoe, is low, thickly wooded, and noticeable owing to a large rock on the coastal reef, which dries, close off it. Tanjong Sakomata, on the eastern side of the southern entrance, is low, but is covered with large trees; Tanjong Batoe (Batu) Gossok is a very prominent rocky point about one mile north-westward of Tanjong Sakomata, and the coast between is bordered by a sandy beach. Both shores northward of Tanjong Batoe Gossok are wooded to the water's edge.



Straat Tjapaloeloe from northward.

(*Original dated* 1933.)

Although the fairway through Straat Tjapaloeloe is very narrow in the southern part it is deep throughout except for two patches in the middle of the southern entrance with depths of about 10 fathoms ($18^{m}3$) over them. The following dangers lie on either side of the fairway:—

A 19-foot ($5^{m}8$) patch lies about 1½ cables north-westward of Tanjong Batoe Gossok, and a 7-foot ($2^{m}1$) patch close off the western shore west-north-westward of this point. A reef, with a least depth of 5 feet ($1^{m}5$) over it, lies about 2 cables off the eastern shore and about 6 cables southward of Tanjong Gina (*Lat. 1° 50′ S., Long. 125° 20′ E.*), situated about 2½ miles northward of Tanjong Batoe Gossok. Three patches, with depths of from 49 to 56 feet ($14^{m}9$ to $17^{m}1$) over them, lie in the northern part of the strait, off the entrance to Baai van Dofa, on the Mangoli shore.

Tanjong Fatoekomboe and Tanjong Wajteja, the western and eastern entrance points, respectively, of the northern end of the strait, are rocky.

Tidal streams.—The tidal streams in Straat Tjapaloeloe are of a mixed character, but the semi-diurnal stream predominates, as shown by the following table on facing page.

The maximum rates of the north-going streams of the diurnal and semi-diurnal tides may fall together, and a maximum rate of about 9½ knots may thus be expected in this direction; this occurs in May and June at 1600, and in November and December at 0400, during

Charts 942a, 1263, 2759a.

Chart 3440, plan of Tjapaloeloe strait and Vesuvius bay.

the seni-diurnal spring tides. The maximum rate of the south-going stream may attain a rate of about 6 knots, during the semi-diurnal spring tides. With semi-diurnal neap tides in May and June, and in November and December, the maximum rate during the day, of either the north-going or the south-going streams, will not appreciably exceed 3 knots, and the same applies to the remaining months of the year.

Semi-diurnal tides.	$\frac{\text{spring}}{\text{neap}}$ tide 2¼ days after $\frac{\text{full and new moon}}{\text{quarter}}$; maximum rate $\frac{\text{6 knots.}}{\text{3¼ knots.}}$ $\left.\begin{array}{l}\text{maximum rate}\\ \text{at spring tides}\end{array}\right\}\frac{\text{N.}}{\text{S.}}$ at $\frac{\text{0400 and 1600}}{\text{1000 and 2200}}\left\{\begin{array}{l}\text{from 6 days before to 6 days after spring tides;}\\ \text{45 min. later each day. With neap tides 6 hrs. later}\\ \text{than at spring tides.}\end{array}\right.$
Diurnal tides.	$\frac{\text{spring}}{\text{neap}}$ tide one day after the moon's $\frac{\text{greatest declination}}{\text{declination 0°}}$; maximum rate $\frac{\text{3¼ knots.}}{\text{0 knot.}}$ maximum rate $\frac{\text{N.}}{\text{S.}}$ 1st Jan. at $\frac{0130}{1330}$, 1st July at $\frac{1330}{0130}$; half an hour earlier each week.

The period of slack water is sometimes of short duration; the greater the maximum rate of the stream before and after slack water, the shorter the period of slack water. The changes in the direction of the tidal streams occur simultaneously in the middle of the strait and under the shores.

Owing to the irregular nature of the bottom in the middle and southern parts of the strait, there are heavy whirlpools and ripples when the tidal streams are strong, often seriously affecting the steering of a vessel; these do not occur in the northern part of the strait.

Anchorages.—Directions.—Vessels from southward awaiting a favourable opportunity of passing through the strait can anchor in the bight between Tanjong Sakomata and Tanjong Batoe Gossok, in a depth of 3¾ fathoms (6^{m}9), where they will lie out of the strong tidal streams.

At the northern end of the strait anchorage can be obtained off the entrance to Baai van Dofa. A spit, with a least depth of 13 feet (4^{m}0) over it, extends from the southern side of the inner part of this bay, otherwise it is clear between the 5-fathom (9^{m}1) lines on either side. The shores of the bay are covered with mangroves.

A vessel from southward should steer for Tanjong Batoe Gossok with the strait open and pass Tanjong Ndoloeselagi at a distance of about 2¾ cables; thence she should steer to pass the same distance from Tanjong Batoe Gossok and then continue on a course parallel with the Taliaboe shore until within about one mile of Tanjong Gina (*Lat. 1° 50′ S., Long. 125° 20′ E.*) when she should gradually close the Taliaboe shore, and pass the point opposite Tanjong Gina at a distance of about 1¼ cables; thence she can steer out of the strait, keeping in the eastern half.

A vessel making for the strait from northward will have no difficulty in identifying the somewhat reddish, rocky Tanjong Fatoekomboe; the strait can then be opened, and the directions previously given followed in the reverse order.

Before proceeding through the strait, the description of the tidal streams given on page 562 should be consulted, so as to ascertain the direction and rate of the tidal stream that may be expected.

Charts 942a, 1263, 2759a.

CHAPTER XVII

EAST COAST OF CELEBES : GOLF VAN TOMINI

Chart 3240.

GOLF VAN TOMINI.—The eastern limit of Golf van Tomini, which separates the northern and eastern peninsulas of Celebes, may be considered to be the line joining Tanjong Pangkalsiang (*Lat. 0° 42′ S., Long. 123° 27′ E.*) and Tanjong Tombalilatoe, about 60 miles northward. The depths in the gulf are great almost throughout, soundings of over 1,000 fathoms (1,828^{m}8) having been obtained over a considerable portion.

The shores of the gulf are sparsely populated by a mixed race, whose chief livelihood is the cultivation of coconut trees; some of the villages are collecting places for forest produce, brought down by the mountain dwellers. Although the gulf abounds in fish, there is practically no fishing carried out. The sea is generally calm, although in the south monsoon there is frequently a long swell in the northern part of the gulf.

Climate.—Local winds and weather.—The monsoons are weak, with large percentages of variable winds. The north monsoon lasts from December to April, when winds may blow from north to north-west. From May to October south-south-east to south-south-west winds prevail, but it blows also from other directions, especially in September, and this south monsoon cannot be relied on.

Constant strong winds are seldom experienced; heavy squalls and thunderstorms are rare. There are no regular wet and dry seasons, and showers occur any time in the year. Land and sea breezes are fairly regular. *See* also page 17.

Dense haze occurs with winds blowing along Tanjong Pangkalsiang over the gulf in the direction of Gorontalo, about 22 miles north-westward of Tanjong Tombalilatoe.

Currents and tidal streams.—Tidal streams are scarcely noticeable. During the South-east monsoon a current was observed northward and north-eastward of Togian eilanden (page 566), running with some strength in a north-easterly direction along the north-east coast of Celebes in the vicinity of Tanjong Flesko (page 599); at the same time a west-going current was observed along the northern shore of the gulf as far westward as Gorontalo.

SOUTHERN SHORE.—Except in the eastern part, between Tanjong Pangkalsiang and Tanjong Batoe Hitam, 44 miles westward,

Charts 942a, 1263, 2759a.

Chart 3240.

the depths are great close along the southern shore of the gulf. Generally the hills rise steeply from the sea, whilst the interior consists of high land with rugged peaks, difficult to identify; the prominent hills and mountains near the coast are described below.

The coast between Tanjong Pangkalsiang and Tanjong Longkoga (*Lat. 0° 34′ S., Long. 123° 03′ E.*), a low point, about 25 miles west-north-westward, is mostly high and steep, and there are several isolated mountains inland; about 7 miles south-south-eastward of Tanjong Longkoga is a massive mountain plateau, named Tompo Tiga, with two summits, the eastern and higher having an elevation of 5,214 feet (1,589^{m}3), and visible in clear weather from the opposite shore of the gulf. Tanjong Pangkalsiang and Tanjong Pasir Pandjang, 3¾ miles north-north-westward, rise perpendicularly from the sea.

Chart 2195, plan of Ampat islands anchorage.

Anchorages.—Ampat eilanden consist of four low coral islets lying near the coast 3½ miles north-westward of Tanjong Pasir Pandjang; the south-eastern islet is a bare sandbank, but the other three are covered with vegetation and can be seen from some distance. Between the two western islets of this group there is a clear passage, 6 cables wide, with a least depth of 3¾ fathoms (6^{m}9), and anchorage can be obtained, in a depth of 5 fathoms (9^{m}1) sand, sheltered from northerly and north-easterly swell, close southward of the eastern of these two islets; small vessels can also reach this anchorage from eastward, passing close southward of the two easternmost islets.

Chart 2195, plan of Bualemo road.

Boealemo (Bualemo) village is situated on the western side of a bight about 6½ miles eastward of Tanjong Longkoga; there is anchorage off this village, in depths of from 9 to 10 fathoms (16^{m}5 to 18^{m}3), with a noticeable hillock about one mile southward of the head of the bight bearing 180°.

The islets Mentawatoe (Mentawatu) Daä and Mentawatoe (Mentawatu) Kiki, lying 4½ miles north-eastward and 3½ miles east-north-eastward, respectively, of Tanjong Longkoga, are low and wooded with high trees.

Chart 3240.

Off-lying dangers.—There are two patches, with depths of 46 and 39 feet (14^{m}0 and 11^{m}9) over them, lying close inside the 100-fathom (182^{m}9) line, about 2½ miles northward and 3½ miles north-north-westward, respectively, of the north-westernmost of Ampat eilanden. A shoal, with a depth of 28 feet (8^{m}5) over it, lies close inside the 100-fathom (182^{m}9) line, about 7½ miles eastward of Mentawatoe Kiki. A 39-foot (11^{m}9) patch lies about 3 miles eastward of the same islet and about 1½ miles offshore.

Coast.—About 6½ miles west-south-westward of Tanjong Longkoga is the eastern extremity of a small peninsula, on the north-western extremity of which is a prominent dark-coloured hill, 374 feet (114^{m}0) high. About 1¾ miles westward of this hill is another small peninsula, on which is a prominent hill, 296 feet (90^{m}2) high, and about 4 miles southward of it is a sharp peak, 1,801 feet (548^{m}9) high. (*See* view facing page 570.) Tanjong Batoe Hitam is a low spur from a prominent hill, 702 feet (214^{m}0) high, lying a short distance within the point.

Off-lying islets and dangers.—Djewas, 8¾ miles west-south-westward of Tanjong Longkoga and about 1½ miles offshore, and Bola,

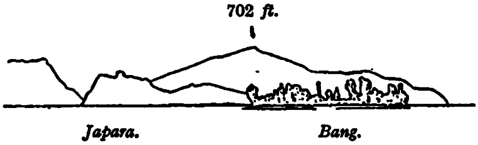
Charts 942a, 1263, 2759a.

Chart 3240.

about three-quarters of a mile east-north-eastward of Tanjong Laloei, situated 6¼ miles east-north-eastward of Tanjong Batoe Hitam, are low islets covered with vegetation. Japara, about 1¾ miles north-eastward of Tanjong Batoe Hitam, is a saddle-shaped islet, 362 feet ($110^{m}3$) high.

Numerous reefs lie within the 100-fathom ($182^{m}9$) line westward of Mentawatoe eilandjes, which embraces the island Poeah, lying about 12 miles north-westward of Tanjong Batoe Hitam; the usual route is outside this plateau, through Straat Walea (page 567), but directions for other routes for crossing the plateau are given below and on pages 568-569. Sendiri, lying on the edge of the plateau 8½ miles north-westward of Tanjong Longkoga, and Bang, about 8 miles west-south-westward of Sendiri, are low, wooded islets fringed by reefs.

Directions.—A vessel with local knowledge bound for Golf van Poh (page 576) should cross the plateau mentioned above about 5½ miles westward of Sendiri steering 220°, and pass about 5½ cables north-westward of Bang and about 2 miles north-westward of Japara. A useful alignment for crossing the 100-fathom ($182^{m}9$) line is the eastern extremity of Bang in line with the western extremity of Japara, and the 702-foot ($214^{m}0$) hill close within Tanjong Batoe Hitam, bearing about 211°. A reef, which dries, lies about one mile westward of the position where the vessel crosses the 100-fathom ($182^{m}9$) line.



702-ft. hill in line with the eastern side of Bang, bearing 211°.

(*Original dated* 1931.)

The vessel's position should be carefully fixed from time to time as there is a rock, with a depth of about 2 feet ($0^{m}6$) over it, lying about 8½ cables south-eastward of the recommended track about 3 miles south-south-westward of Bang (*Lat. 0° 31′ S., Long. 122° 48′ E.*), and there are several reefs in the vicinity of Tanjong Batoe Hitam. When westward of this point the vessel should steer 220° which leads between a sand cay, which just covers, on the eastern side, and a small coral islet covered with vegetation, on the western side; there are often whirlpools northward of the sand cay. When past the islet and sand cay the vessel will be in deep water again.

The description of the southern shore of Golf van Tomini westward of Tanjong Batoe Hitam, including Golf van Poh, is continued on page 576.

TOGIAN EILANDEN.—Togian eilanden lie north-westward of Tanjong Batoe Hitam, and cover an extensive area in the southern half of Golf van Tomini. The principal islands of the group are Poeah, Walea Bahi, Walea Kodi, Talata Koh, Togian, Batoe Daka, and Oena Oena. Poeah, the south-eastern island, is separated from the main group by Straat Walea; Talata Koh, Togian, and Batoe Daka are separated from each other by such narrow channels that

Charts 942a, 1263, 2759a.

Chart 3240.

they almost form one island; Oena Oena, the north-western island, is separated from the main group by a wide and deep passage.

All the islands are hilly, and some are mountainous, the peaks on Walea Bahi, Walea Kodi, Togian, and Oena Oena being visible from a great distance (*see* views facing page 570). The main group is surrounded by an almost continuous barrier of reefs, with depths of over 100 fathoms ($182^{m}9$) immediately outside; navigation between the islands of this group demands the utmost caution, owing to the innumerable reefs, and, unless they are clearly marked by discoloration, is almost impracticable. There are, however, two main routes through the group, from north to south or *vice versa*, which, with caution, may be used with safety; these two routes run between Walea Kodi and Walea Bahi (*see* page 568), and between Walea Kodi and Talata Koh (*see* page 570), respectively.

Poeah and adjacent islets.—Poeah is hilly, with the highest part at the south-western extremity; the northern and western sides are steep. The inhabitants live in two villages, both situated on the south coast, and a native chief resides in the western village. Bani, a rocky islet with coconut plantations on it, lies about 1¾ miles eastward of Poeah, with a channel clear of dangers between. Bangoe is a low islet about 8½ cables north-westward of the north-western extremity of Poeah. Several islets, all covered with vegetation, lie southward of Poeah, the principal being Toelawajang and Manoh (*Lat. 0° 34′ S., Long. 122° 35′ E.*), the passage between Toelawajang and Poeah, although nearly 3 miles wide, is greatly encumbered by reefs, which partly dry and are marked by discoloration.

Anchorage.—Directions.—There is anchorage off the western village on the south coast of Poeah, in a basin in the coastal reef, in a depth of 16 fathoms ($29^{m}3$). Vessels making for this anchorage from westward can safely proceed along the south coast of Poeah, as the coastal reef is plainly marked by discoloration.

Vessels from southward can reach the anchorage by steering for the eastern extremity of Bani, bearing 048°, when outside the 100-fathom ($182^{m}9$) line, and thus passing between the two islets Toelawajang and Manoh; when a sandbank, about one mile eastward of Manoh, bears 163°, it should be kept astern on this bearing, and the western village on Poeah will then be sighted right ahead; the sandbank is very prominent on account of a round-topped tree in the middle.

Vessels from northward should steer for Dondola, a coral wooded islet just within the 100-fathom ($182^{m}9$) line and about 5 miles northward of Bani; the 100-fathom ($182^{m}9$) line should then be crossed by passing close eastward of the reef fringing Dondola, which is marked by discoloration. A reef, with a depth of 16 feet ($4^{m}9$) over it, lies about 1½ miles south-eastward of Dondola; two bare sandbanks lie on a reef, which dries, about half a mile west-south-westward of Dondola. After passing Dondola vessels can proceed through the channel between Bani and Poeah, and thence follow the south coast of Poeah until the western village bears 343°.

Straat Walea.—Light.—Straat Walea lies between some reefs, which dry, at the extremity of the plateau extending about 7 miles north-westward from the western extremity of Poeah, on the south-east, and by a reef extending about one mile from Tanjong Balikapata, the low but prominent south-eastern extremity of Walea Bahi, on

Charts 942a, 1263, 2759a.

Chart 3240.

the north-west. Tide-rips are frequently seen in this strait, but it is a safe passage, and is sometimes used by vessels proceeding between the southern side of Golf van Tomini and Gorontalo.

A light is exhibited, at an elevation of 60 feet ($18^{m}3$), from a black iron beacon on the north-western end of the drying reef on the south-eastern side of the strait. Teloga, a wooded islet about 1½ miles east-south-eastward of the light-structure, is a useful mark.

Nearly 1¾ cables eastward of the drying reef on which the light-structure stands is a reef, which partly dries, and temporary anchorage can be obtained by vessels with local knowledge, in depths of from 10 to 11 fathoms ($18^{m}3$ to $20^{m}1$), on the ridge connecting these two reefs.

Walea Bahi.—Dangers.—Anchorage.—Walea Bahi, the easternmost island of the main group of Togian eilanden, has five summits, all useful for fixing a vessel's position; the highest summit, with an elevation of 1,468 feet ($447^{m}4$), is situated at the north-western end of the island. The coasts are mostly steep. A number of reefs, the positions of which may best be seen on the chart, lie within the 100-fathom ($182^{m}9$) line off the east and north-east coasts of Walea Bahi, and one of them, about one mile northward of Tanjong Teloempoeng (*Lat. 0° 16′ S., Long. 122° 22′ E.*), the north-eastern extremity of the island, dries. There are several villages along the east and north-east coasts, the principal from south to north being Liang, Tinggi, Katogop, Malappo, and Kanari; there is a fishing settlement on the eastern side of Tanjong Balikapata.

Tanjong Kramat, on the north coast about 6½ miles north-westward of Tanjong Teloempoeng, is a rocky peninsula with two hillocks on it; there is a bay on either side of this point, and anchorage can be obtained by vessels with local knowledge just within the entrance to the western bay, in a depth of 25 fathoms ($45^{m}7$), mud and sand. A ridge, with a depth of 19 feet ($5^{m}8$) over the outer end and less inside, extends about half a mile eastward from the western entrance point of this bay, and a rocky islet lies on this ridge fully 2 cables from its outer extremity; a reef, with a depth of 11 feet ($3^{m}4$) over it, lies about half a mile north-westward of Tanjong Kramat (*Lat. 0° 13′ S., Long. 122° 17′ E.*), and is marked by discoloration. By steering for a noticeable roof of a house in Kanari village, situated at the head of the bay, bearing 210°, a vessel will pass between the 11-foot ($3^{m}4$) reef and the ridge extending from the western entrance point; this course, however, leads over a 26-foot ($7^{m}9$) patch farther outside, on the edge of the 100-fathom ($182^{m}9$) line, and the vessel should keep a little north-westward of the course in this vicinity. A reef, with a depth of 16 feet ($4^{m}9$) over it, lies about 3½ cables eastward of the 26-foot ($7^{m}9$) patch.

Strait between Walea Bahi and Walea Kodi.—Dangers.—Beacon.—Anchorage.—Directions.—This strait is deep throughout the route described below and, as there are many landmarks for fixing the vessel's position, it is easy for vessels with local knowledge to navigate. A vessel making for the strait from southward should pass about 3 cables westward of the reef extending southward from Tanjong Balikapata, which is plainly marked by discoloration, and thence midway between this point and a small reef, which dries, about 6 cables west-south-westward; a black beacon, surmounted by a cone, stands

Charts 942a, 1263, 2759a.

on the eastern edge of a reef, which dries, about 2 miles westward of Tanjong Balikapata. Thence the vessel should steer a north-westerly course so as to pass about 4 cables north-eastward of a 23-foot ($7^{m}0$) patch about 5¼ miles north-westward of Tanjong Balikapata, and fully half a mile south-westward of Peladan and the Delapan eilanden, which lie close off the middle of the south-west coast of Walea Bahi; on the south-western side of the fairway here are two reefs, with depths of 8 and 19 feet ($2^{m}4$ and $5^{m}8$) over them, situated about 1¼ miles west-south-westward of Peladan and 9 cables south-westward of Delapan, respectively.

The vessel should then steer to pass north-eastward of Mekeja, a hilly islet, lying about one mile eastward of the south-eastern end of Walea Kodi, and thence for the narrowest part of the strait about 2 miles north-westward of Mekeja, where the width of the channel is barely half a mile. Two spits extend here from the Walea Bahi shore, and the vessel should pass westward of Bango, an islet lying on the extremity of the southern spit. The remainder of the strait is clear of dangers, except for an 11-foot ($3^{m}4$) patch lying about 3 cables from the Walea Kodi shore, one mile southward of Tanjong Towani, the northern extremity of this island.

Anchorage can be obtained by vessels with local knowledge, in a depth of about 14 fathoms ($25^{m}6$), off Dolong village, situated at the head of a bay about 1½ miles westward of Bango; Dolong is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Walea Kodi.—Dangers.—The highest peak of Walea Kodi, situated on the western side of the southern part of the island, is 1,304 feet ($397^{m}4$) high and very prominent; there is also a conical hill, noticeable from south-westward, near the north-western coast, which is a mark for vessels using Straat Malingi (page 571), but its exact position has not been determined.

A reef, which dries, lies just within the 100-fathom ($182^{m}9$) line, about 1½ miles north-westward of Tanjong Towani (*Lat. 0° 12′ S., Long. 122° 12′ E.*), and some shoals, with a least depth of 23 feet ($7^{m}0$) over them, lie close together, within three-quarters of a mile northward of this point; otherwise there are no known dangers off the north-west coast of the island.

Miloh and Boloko, two hilly islets, lie close off the south-western and southern extremities of the island, respectively; several detached reefs, the positions of which may best be seen on the chart, lie within 2 miles of the south-west coast between these two islets.

Taoleh is a hilly island about 1¼ miles westward of Miloh, and has a noticeable tree on its summit; the island is uninhabited, but is cultivated with coconut trees, and a few temporary huts stand on the north-east coast. Taoleh is fringed by a reef, extending as much as about 3 cables from the western side; the western half of the passage between Taoleh and Miloh is deep, but several reefs lie in the eastern half.

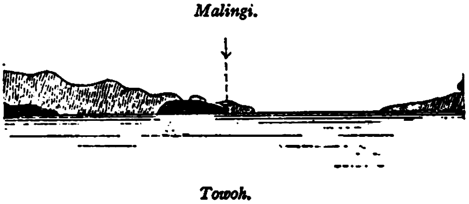
Talata Koh, Togian, and Batoe Daka.—Togian, the middle island of the three, is separated from Talata Koh by Straat Benteng and from Batoe Daka by Straat Batoe Daka. The hills on Talata Koh and Batoe Daka have no noticeable features, and the highest and most noticeable summits are on a ridge running in a north and south direction across Togian; Piek van Togian, 1,776 feet ($541^{m}4$) high,

Chart 3240.

in the middle of this ridge, is very prominent (*see* view facing this page). The coasts of all three islands are planted with coconut trees.

Strait between Walea Kodi and Talata Koh.—Dangers.—Directions.—The east coast of Talata Koh, forming the western side of this route, is indented with numerous small bays, mostly separated from each other by prominent rocky points and is sparsely populated. Three islets lie on the coastal reef about 3 cables northward of Tanjong Oeting, the south-eastern extremity of Talata Koh, and another islet lies on a projecting part of the coastal reef about one mile north-north-eastward of the same point. The islet Towoh lies on the outer end of a reef extending 4 cables north-eastward from a salient point about 4¾ miles northward of Tanjong Oeting.

A vessel with local knowledge making for the strait between Walea Kodi and Talata Koh from southward should cross the reef barrier along the 100-fathom ($182^{m}9$) line with the eastern extremity of Malingi, an island off the northern extremity of Talata Koh, bearing 330°, just open north-eastward of Towoh; this course leads fairly close north-eastward of a reef, which dries, lying about 3½ miles south-eastward of Tanjong Oeting, and half a mile south-westward of a small reef, which dries, lying about 3½ miles eastward of the same point. When the north-western extremity of the islet situated about one mile north-north-eastward of Tanjong Oeting is in line with the south-eastern extremity of the three islets about 3 cables north-eastward of that point, bearing 209°, the vessel should steer 000° for about 3¼ miles, passing about 6 cables westward of a small reef, which dries, lying about 3 miles south-eastward of Towoh (*Lat. 0° 20′ S., Long. 122° 08′ E.*), and about 2½ cables eastward of a similar reef lying about 2 miles south-south-eastward of Towoh; these reefs are usually marked by discoloration; a 16-foot ($4^{m}9$) patch lies about 1½ miles eastward of Towoh, so the vessel should keep a little nearer to this islet in this vicinity. When the north-eastern extremity of Malingi is in line with the south-western extremity of Taoleh, bearing 316°, she should keep on this alignment, and thence proceed northward of the group, passing either side of Taoleh; if bound for Straat Malingi she should pass southward of Taoleh and then follow the directions given below.



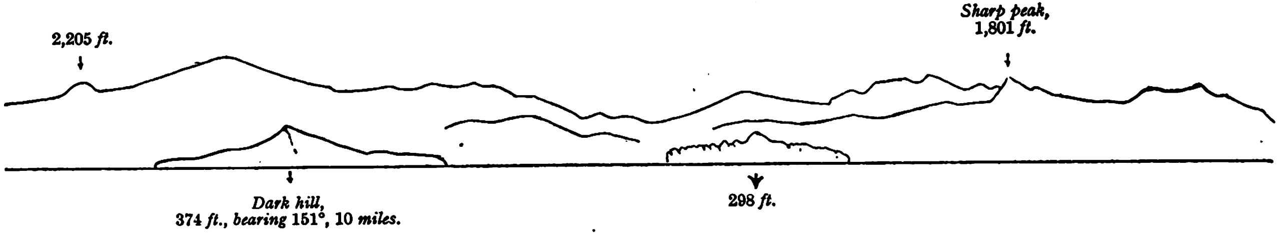
Eastern extremity of Malingi, bearing 330°, just open north-eastward of the north-eastern extremity of Towoh.

(*Original dated prior to* 1934.)

A vessel proceeding through the strait between Walea Kodi and Talata Koh from northward can follow the directions described above in the reverse order.

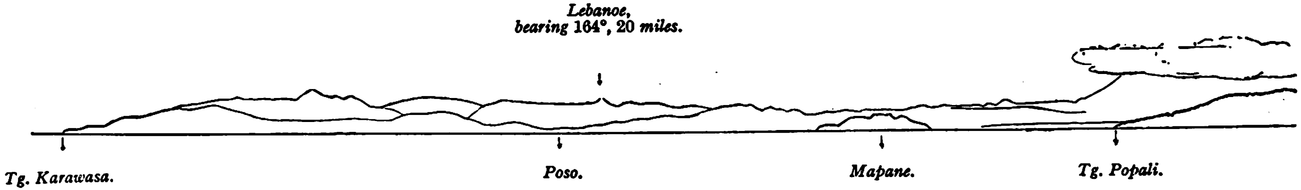
Charts 942a, 1263, 2759a.

To face page 570.



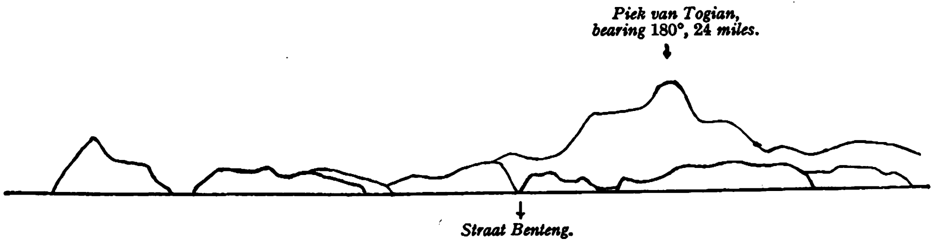
Golf van Tomini, southern shore, eastward of Tanjong Batoe Hitam.

(*Original dated* 1931.)



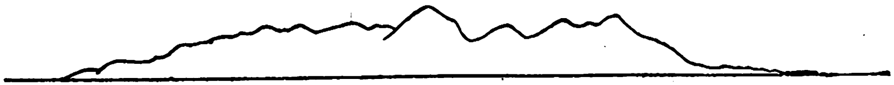
Golf van Tomini, southern shore. Bocht van Poso.

(*Original dated* 1931.)



Golf van Tomini. Togian eilanden.

(*Original dated* 1931.)

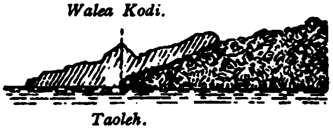


Golf van Tomini. Oena Oena, bearing 278°, distant about 20 miles

(*Original dated* 1931.)

Chart 3240.

Straat Malingi.—Straat Malingi, separating the island of Malingi from the northern extremity of Talata Koh, is deep and clear of dangers in the fairway; the north-eastern entrance is narrow, but the reefs extending from either side are usually plainly marked by discoloration. The noticeable conical hill on the north-west coast of Walea Kodi (*see* page 569) in line astern with the northern extremity of Taoleh, bearing 063°, leads through the strait, and farther westward to Tongkaboe (*see* below).



Hill on Walea Kodi in line with the northern extremity of Taoleh, bearing 063°.

(*Original dated prior to* 1934.)

Malingi is a hilly island, attaining an elevation of 690 feet ($210^{m}3$) in the south-western part; when seen from a distance northward the island appears as a ridge of almost equal elevation throughout its length, but on approaching nearer a valley will be seen in the narrow part of the island, just eastward of the middle. The southern side of the island is covered with coconut plantations extending far up the slopes; the north coast is steep and rocky, with a few small sandy beaches. There are a few huts along the north-east coast, and anchorage can be obtained here by vessels with local knowledge about 2¾ cables offshore, outside the 5-fathom ($9^{m}1$) line.

Langkara, an island, 464 feet ($141^{m}4$) high, is separated from the south-western extremity of Malingi by a channel clear of dangers about three-quarters of a mile wide.

There is a clear and deep passage between the north coasts of Malingi and Langkara and the barrier reef along the 100-fathom ($182^{m}9$) line, which can be entered from north-eastward through the wide opening in the barrier northward of Taoleh, and from the south-westward by a wide opening about 2½ miles westward of Langkara.

Northern coasts of Talata Koh and Togian.—Anchorages.—The northern coasts of Talata Koh and Togian are high, steep and rocky and are indented by numerous bays and creeks, the principal being Kilat baai, in the western half of Togian. The coast is fronted by several hilly islets, covered with coconut plantations, and numerous reefs and patches, which dry, and the wide bight in the eastern part, between the northern part of Talata Koh and the peninsula forming the eastern side of Kilat baai, is so encumbered with reefs that navigation is difficult; the northern entrance to Straat Benteng lies in the south-eastern corner of this bight.

Tongkaboe, an islet, 303 feet ($92^{m}3$) high, lies about 2 miles south-westward of Langkara (*Lat. 0° 17′ S., Long. 122° 00′ E.*), and Tongkaboe village, a market-place for copra, is situated along a small sandy beach on its southern side; there is anchorage for vessels with local knowledge off this village, in a depth of about 19 fathoms ($34^{m}7$), about 2 cables offshore, and the leading mark for Straat Malingi (*see* above) leads to the anchorage. Tongkaboe is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. From north-

Charts 942a, 1263, 2759a.

ward of Tongkaboe to the north-western extremity of Togian there is a deep and clear passage within the barrier reef along the 100-fathom (182^{m}9) line.

There is a small pier at Katoepa village, on the south-eastern side of Pangempan, an island lying close off the northern extremity of Togian, about 1¼ miles north-eastward of the eastern entrance point of Kilat baai; large boats can lie alongside the pier.

Kilat baai affords spacious anchorage for vessels with local knowledge in the outer part, in depths of from 22 to 27 fathoms (40^{m}2 to 49^{m}4); owing to the coastal reef and islets on either side, the entrance is very narrow. The barrier reef within the 100-fathom (182^{m}9) line is widest northward of the entrance, and the least depth, 11 feet (3^{m}4), lies nearly 1½ miles northward of the western entrance point. To enter the bay, when within this patch, a vessel should steer for a noticeable fan-shaped tree at the head of the bay, bearing 147°, which leads about one cable north-eastward of Batu Mandi, the easternmost of three rocky islets off the western entrance point. The shores of the bay are low and covered with mangroves, and form numerous creeks; the land rises rapidly within, and there are extensive coconut plantations on all the slopes.

Islands and reefs off the north-western side of Togian.—Kadidi, a steep rocky island, lies close off the north-western side of Togian. Groot Impodi and Klein Impodi, also steep and rocky, lie close together north-westward of Kadidi, with a deep strait, clear of dangers, half a mile wide, between. Reefs extend along the 100-fathom (182^{m}9) line for about 2½ miles northward of Impodi eilanden. There are numerous reefs and a few rocky islets along the north coast of Kadidi, so vessels without local knowledge should keep outside the 100-fathom (182^{m}9) line here; the narrow passage between this island and Togian is only navigable for boats. About 2¼ miles northward of Kadidi there is a wide opening clear of dangers, in the barrier along the 100-fathom (182^{m}9) line.

Bocht van Batoe Daka.—Beacons.—Dangers.—Between Kadidi and Tanjong Keiloemba, the extremity of a high, broad peninsula about 5½ miles south-westward, a bay is formed by the coasts of the north-western side of Togian and the eastern part of the northern side of Batoe Daka. Pohon Ndongo, an island 421 feet (128^{m}3) high, lies in the middle of this bay; Bobakoe lies about 8 cables westward of Pohon Ndongo, and Pinoemota about the same distance south-westward of Pohon Ndongo, with an un-named island between Pinoemota and Bobakoe; these three islands are hilly. The south-western part of the bay, including all these islands, is dangerous owing to the numerous reefs, although there is a clear area all around Bobakoe.

A reef, which dries, lies half a mile within the 100-fathom (182^{m}9) line about 1½ miles north-westward of Pohon Ndongo, and on the north-western side of this reef is a very prominent group of rocks, well above water. Two reefs, with depths of 15 and 18 feet (4^{m}6 and 5^{m}5) over them, respectively, lie about midway between the drying reef and Pohon Ndongo.

Batoe Daka village (*Lat. 0° 24′ S., Long. 121° 51′ E.*), a collecting place for the coconut plantations on Batoe Daka, is situated on the western entrance point of Straat Batoe Daka, the narrow, tortuous channel between Batoe Daka and Togian. Batoe Daka village can be reached by vessels with local knowledge through a passage clear of dangers, marked by two white beacons, each surmounted by a ball, along the eastern shore of the bay; the northern beacon stands on the north-eastern side of a reef, with a least depth of one fathom ($1^{m}8$) over it, lying about one mile south-south-westward of the southern extremity of Kadidi, and the southern beacon marks the extremity of the reef extending about one mile north-westward from Batoe Daka village.

Directions.—The following is the safest route for making the anchorage off Batoe Daka village:—From outside the 100-fathom ($182^{m}9$) line a vessel should steer for the northern beacon, bearing 135°, thus crossing the barrier about 3½ cables south-westward of the Impodi eilanden, in a least depth of 15 fathoms ($27^{m}4$), and passing about 3 cables north-eastward of a 42-foot ($12^{m}8$) patch. When the south-western extremity of Kadidi is abeam the vessel should alter course to 123°, so as to avoid a 23-foot ($7^{m}0$) patch lying about half a mile north-westward of the northern beacon; the south-western extremity of Klein Impodi will then gradually come in line with the south-western extremity of Groot Impodi, bearing about 318° astern, which leads clear north-eastward of the reef marked by the northern beacon, and south-westward of two rocky heads off the western entrance to the strait between Kadidi and the Togian coast. When the northern beacon is in line with the south-eastern side of Pohon Ndongo, bearing about 226°, she should steer for Batoe Daka village, and gradually bring Klein Impodi in line astern with the northern beacon, bearing about 325°, which leads 3 cables north-eastward of the southern beacon; when this beacon is in line with the cluster of rocks on the drying reef about 1½ miles west-north-westward of Pohon Ndongo, bearing about 287°, the vessel will be in a depth of about 11 fathoms ($20^{m}1$), and should anchor.

North-west coast of Batoe Daka.—Off the north-west coast of Batoe Daka, south-westward of Tanjong Keiloemba, the barrier formation within the edge of the 100-fathom ($182^{m}9$) line is much stronger, and many of the reefs dry. The coast is rocky, and is indented by numerous bights with occasional sandy beaches, and the slopes within are covered with coconut plantations; Bomba village, about 1¼ miles northward of Tanjong Tjopatanah, the south-western extremity of the island, is a collection of scattered huts. Within the 10-fathom ($18^{m}3$) line are innumerable islets and reefs, and the coast should not be approached within this depth. Except for a few isolated reefs in the south-western part, the area between the barrier reef and the 10-fathom ($18^{m}3$) line is clear of dangers.

Off-lying island and dangers.—Pasir Tengah is an atoll-shaped reef lying outside the barrier reef and about 7 miles westward of Tanjong Keiloemba (*Lat. 0° 25′ S., Long. 121° 46′ E.*); the basin within has depths of from 16 to 27 fathoms ($29^{m}3$ to $49^{m}4$), but the encircling reef can only be crossed by light craft at high water. About 1½ miles eastward of the northern end of Pasir Tengah is another atoll-shaped reef, having an entrance on the south-eastern side, with depths of from one to 5 fathoms ($1^{m}8$ to $9^{m}1$) in it.

Taoepan, a thickly wooded, rocky island, 270 feet ($82^{m}3$) high, lies 2 miles west-south-westward of Tanjong Tjopatanah, the south-western extremity of Batoe Daka; it is entirely surrounded by a coral reef,

Chart 3240.

with a deep basin within on the northern side of the island, but the reef can only be crossed by small craft at high water and with a calm sea. The coast of the island consists mostly of steep, rocky cliffs. There is a clear channel, 1¼ miles wide, with depths of over 100-fathoms (182^{m}9), between the reef surrounding Taoepan and the reef extending from Tanjong Tjopatanah. The island is uninhabited.

South coasts of Talata Koh and Togian.—Anchorages.—Owing to the numerous dangers within the 100-fathom (182^{m}9) line, inshore navigation along these coasts is impracticable for vessels of any size without local knowledge, except in Baai van Togian, on the south coast of Togian.

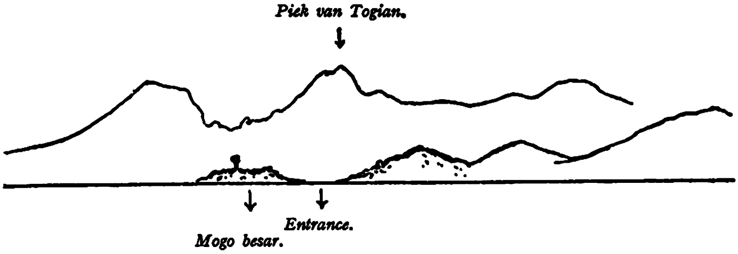
Telok Lajang, is a deeply penetrating, uninhabited bay on the south coast of Talata Koh. The entrance is greatly encumbered by islets and reefs, leaving only a very narrow passage, with a depth of 19 fathoms (34^{m}7), towards the western side. The easiest way for a vessel with local knowledge to approach the bay is from the eastward, crossing the barrier by passing northward of the reef, which dries, about 3½ miles east-south-eastward of Tanjong Oeting (page 570).

The southern entrance to Straat Benteng is encumbered by numerous shoals and small islets; a barrier reef extends southward from the south-eastern entrance point to those on the 100-fathom (182^{m}9) line.

Charts 2718, plan of Togian bay, 3240.

Baai van Togian and approaches.—Dangers.—Baai van Togian, about 7½ miles westward of Tanjong Oeting, can be entered without difficulty by vessels with local knowledge, as the drying reefs on either side of the approach channel are clearly marked by discoloration, and stakes are usually placed on their edges by the natives. The islets Mogo besar and Mogo kechil lie on the reef, which dries, extending about one mile south-eastward from the western entrance point. There is a conspicuous tree close within the southern extremity of Mogo besar (*Lat. 0° 26′ S., Long. 122° 01′ E.*).

A reef, with a depth of 5 feet (1^{m}5) over it, barely marked by discoloration, lies just within the 100-fathom (182^{m}9) line, about half a mile southward of Mogo besar, and a 23-foot (7^{m}0) patch lies close northward of this reef.


Piek van Togian.
Mogo besar.
Entrance.

Entrance to Baai van Togian; Piek van Togian, bearing 328°.

(*Original dated* 1931.)

Anau, is a high islet, fringed by a reef, extending about 3½ cables

Charts 942a, 1263, 2759a.

Charts 2718, plan of Togian bay, 3240.

from its southern side, lying 2 miles westward of Mogo besar. Keboja village stands on the northern side of Anau.

Anchorage.—Directions.—Anchorage may be obtained at the head of the bay, in a depth of about 9 fathoms ($16^{m}5$), off Benteng village, a collecting place for copra and the residence of a native chief; there is a pier at Benteng (*Lat. 0° 24′ S., Long. 122° 00′ E.*), where boats can lie alongside at all times.

After rounding the south-eastern extremity of Mogo besar the north-east coast of this islet can be followed, taking care to avoid the reefs extending from either side of the entrance, which are plainly marked by discoloration; although the passage is somewhat narrow, there is a least depth of about 16 fathoms ($29^{m}3$) in the fairway and the bay can be entered by eye.

Chart 3240.

East and south coasts of Batoe Daka.—The eastern and southern sides of Batoe Daka are hilly, but have no conspicuous summits; the coast is mainly covered with mangroves, broken in places by steep, rocky points. There are coconut plantations in places, usually with a small settlement close by.

About 3 miles west-south-westward of Anau is Tombolang, an island lying off the southern entrance to Straat Batoe Daka. This island, together with Staboe and Pontianak, about half a mile and 1¼ miles, respectively, southward of Tomboling, can be readily identified. There are numerous reefs within the 100-fathom ($182^{m}9$) line off the east coast of Batoe Daka, and also off the south coast between Tanjong Tjopatanah and Tanjong Kakema, about 11 miles east-north-eastward, rendering the latter coast inaccessible.

Oena Oena.—Oena Oena lies about 15 miles north-westward of Batoe Daka, with a clear and very deep passage between. In the middle part of the island is a volcano, with an old crater fully one mile in diameter, rising to its highest part on the north-western side to an elevation of 1,664 feet ($507^{m}2$); as this crater is covered with vegetation, it does not give the appearance of a volcano, and no smoke has been seen issuing from it since 1898. The lower slopes are covered with coconut plantations, and the inhabitants are very prosperous. Tampo village is situated on the south-western coast.

The 100-fathom ($182^{m}9$) line lies only a short distance off the island, and there is no anchorage except in Reede Oena Oena, on the north-east coast. The only dangers are a reef, with a depth of 8 feet ($2^{m}4$) over it, lying about one mile south-south-eastward of Oena Oena village and outside the 100-fathom ($182^{m}9$) line; some reefs in Reede Oena Oena; a rock, which dries, close off the north coast, and a 5-foot ($1^{m}5$) patch close offshore about one mile southward of the western extremity of the island. *See* view facing page 570.

Chart 2718, plan of Una Una road.

Reede Oena Oena.—Light.—Dangers.—Beacons.—A reef, which dries, extends south-eastward from the northern end of Oena Oena (Una Una) village, about three-quarters of a mile south-south-eastward of the north-eastern extremity of the island, and is marked at its outer end by a white iron beacon, surmounted by a ball, and on which a light is occasionally exhibited, at an elevation of 8 feet ($2^{m}4$). Two detached reefs lie about 1¾ cables offshore about 4 and 5¼ cables, respectively, southward of the light-beacon (*Lat. 0° 08′ S.*,

Charts 942a, 1263, 2759a.

Chart 2718, plan of Una Una road.

Long. 121° 39′ E.). A black beacon, surmounted by a cone, stands on the northern extremity of the northern detached reef.

Reede Oena Oena (Una Una) is bounded by a line joining the two above-mentioned beacons, and by lines drawn in a 310° direction from the white beacon surmounted by a ball, and in a 225° direction from the black beacon surmounted by a cone.

Vessels anchoring off the village should veer the cable to from 35 to 40 fathoms ($64^{\mathrm{m}}0$ to $73^{\mathrm{m}}2$), and steer a west-south-westerly course midway between the light-beacon and the black beacon, anchoring as soon as the anchor holds. There is only room for two vessels in the roadstead at the same time. There is a small pier near the flagstaff at the northern end of the village.

Oena Oena village is the residence of the native chief, with the title of Rajah, for the whole of the Togian group; there are numerous Chinese traders. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3240.

SOUTHERN SHORE OF GOLF VAN TOMINI (*continued*).—**Golf van Poh.—Dangers.—Beacon.**—Golf van Poh, entered southward of Tanjong Batoe Hitam (page 565), has mountainous land within its shores; on the northern side the mountains are isolated, but the southern side is occupied by a long ridge of almost the same elevation throughout. There are no known dangers outside the 100-fathom ($182^{\mathrm{m}}9$) line, which lies close off the northern shore, but on the southern side it is farther offshore. Several reefs, with a least depth of 3 feet ($0^{\mathrm{m}}9$) over them, lie within 2 miles of the shore off Dindinga, a village about 8½ miles southward of Tanjong Batoe Hitam, and the north-western of these is marked by a white beacon. There is a small shoal, with a least depth of 1½ fathoms ($2^{\mathrm{m}}7$) over it, at the head of the gulf.

A fairly strong south-south-easterly wind blows during the daytime in the easterly monsoon; at night the air flowing from the high ground may cause a strong, gusty east wind, which decreases in force where the gulf becomes wider.

Chart 2718, plan of Pagimana road.

Reede Pagimana.—Dangers.—Beacons.—Buoy.—Pagimana village, a trading place for copra, is situated on the southern side of the entrance to a lagoon, about 6 miles westward of Dindinga; the lagoon is inaccessible, as it is entirely closed by a reef immediately westward of Pagimana, but a basin in the coastal reef off the village affords sheltered but confined anchorage, in a depth of 14 fathoms ($25^{\mathrm{m}}6$). A fishing village, built on piles, is situated on the reef extending from the northern entrance point of the basin. There is a stone pier, with a landing place for boats, at Pagimana village. Two detached reefs, which dry, marked by unofficial beacons, surmounted by a white cylinder, with a few huts on piles erected on them, and plainly marked by discoloration when covered, lie off the entrance to the basin; similar beacons mark a detached reef, on its eastern side, about 6½ cables north-north-eastward of the head of the pier, and the south-eastern edge of the reef extending about 1¾ cables south-eastward from the northern entrance point of the basin. An unofficial beacon, surmounted by a truncated cone, marks the edge of the coastal reef about 3 cables east-south-eastward of the head of the pier. Vessels remaining

Chart 2718, plan of Pagimana road.

only a short time will find it more convenient to anchor just within these reefs, in a depth of 25 fathoms ($45^{m}7$).

A reef, with a depth of about 3 feet ($0^{m}9$) over it, lies about 1½ miles north-eastward of Pagimana village, and is marked by a white conical buoy; a reef, with a depth of 5 fathoms ($9^{m}1$) over it, lies about 7 cables north-north-eastward of the northern entrance point of the basin.

Pagimana is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3240.

Coast.—Dangers.—Beacon.—The coast between Pagimana and Tanjong Api (*Lat. 0° 48′ S., Long. 121° 39′ E.*), about 60 miles westward, is hilly, with mountains rising a short distance within, but the only prominent summit near the coast is Abasong, 2,557 feet ($779^{m}4$) high, close to the coast about 14 miles westward of Pagimana. The only known danger outside the 100-fathom ($182^{m}9$) line along this part of the coast is Kabini, a small reef, which dries, lying about 2½ miles offshore and midway between Pagimana and Tanjong Api; a black beacon, surmounted by a cone, stands on the south-eastern side of this reef. Within the 100-fathom ($182^{m}9$) line the only detached dangers outside the coastal reef are: a 27-foot ($8^{m}2$) patch about 6 cables offshore and about 1¾ miles north-westward of Loboe, a village about 10 miles westward of Pagimana; a small reef, which dries, about 4 cables offshore and about 8 cables northward of Pongian, a village about 18 miles westward of Loboe; and a number of reefs, with three coral islets named Tètè, lying about 4¾ miles southward of Tanjong Api, and which extend as far as one mile offshore.

Chart 2195, plan of Bunta road.

Anchorages.—Boenta (Bunta) village, situated on the northern side of a small bay about 2½ miles south-westward of Pongian, is a trading place for copra and forest produce, and is one of the most important places in Golf van Tomini after Gorontalo. Paniki (chart 3240), an islet lying on a reef, which dries, about half a mile north-westward of the southern entrance point of the bay, is a useful mark for vessels approaching the bay. There is good anchorage, in a depth of 30 fathoms ($54^{m}9$), about one cable from the pier. Reede Boenta is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 2195, plans of Tobelombangi, Balingara, and Sabo roads.

Tobelombangi, 11½ miles south-westward of Boenta, Balingara, 8½ miles westward of Tobelombangi, and Sabo, about 3 miles farther westward, are three small villages on the southern shore of the wide bight between Boenta and Tanjong Api, and are occasionally visited by small vessels for copra. As there are great depths until close to the coast, it is advisable to veer from 30 to 40 fathoms ($54^{m}9$ to $73^{m}2$) of cable and proceed in until the anchor holds. There is a small landing pier at Tobelombangi. During the easterly monsoon a strong south-east wind, which quickly raises a sea, may spring up at about 0900 between Tobelombangi and Tanjong Api, where the wind comes through between the mountains.

Chart 3240.

Coast.—Dangers.—Beacons.—Tanjong Api is the first distinctive feature of the land westward of Golf van Poh; it rises to a flat

Charts 942a, 1263, 2759a.

Chart 3240.

summit, 1,819 feet (554^{m}4) high, with a low, wide strip of land between it and the high mountains southward. Labuan Blanda, on the western side of the low strip of land, affords anchorage to vessels with local knowledge close to the shore eastward of Ampana village, on the southern shore of the bay, in a depth of 30 fathoms (54^{m}9); the place is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Two detached reefs, marked by beacons, lie off the northern shore of the bay, and there is a small inlet in the coastal reef, forming a natural harbour for praus.

Off-lying island.—Boeka Boeka, a wooded island, 431 feet (131^{m}1) high, lies about 7 miles north-eastward of Tanjong Api.

BOCHT VAN POSO.—The coast between Tanjong Api (*Lat. 0° 48′ S., Long. 121° 39′ E.*) and Tanjong Saoesaoe, about 70 miles westward, forms a wide bay, known generally under the name of Bocht van Poso. The shores of this bay are mostly steep, and the following prominent summits lie close within them:—Morowo Bae, 2,163 feet (659^{m}3) high, about 12½ miles south-westward of Tanjong Api, appears more as a shoulder of a range than as a summit when seen from westward; Mawoeroto, about 10 miles south-westward of Morowo Bae, is 3,895 feet (1,187^{m}2) high; about 3¾ miles northward of Mawoeroto and close southward of Bongka village (page 579), is a dome-shaped hill, 775 feet (236^{m}2) high; Kandela, about 15½ miles south-south-westward of Mawoeroto, is a steep, rocky wall in the mountains; Oentoe Jowi, or Scherpe piek, about 6½ miles south-south-westward of Kandela, is a sharp peak formed by a spur from a higher but less conspicuous mountain. Tongkoe or Bultberg, about 22 miles westward of Oentoe Jowi, is 2,143 feet (653^{m}2) high, and the easternmost of three summits near the southern shore of the bay; Lebanoe, about 4¾ miles south-westward of Bultberg, is 1,473 feet (449^{m}3) high and is shaped like a beehive. *See* view facing page 570.

Outlying dangers.—Beacons.—Haarlemmermeer, about 44 miles westward of Tanjong Api, is a coral reef, which partly dries, marked by surf and discoloration when covered; a black beacon, surmounted by a cone, stands on its northern side. A reef, with a depth of 16 feet (4^{m}9) over it, lies about 3½ miles north-north-westward of Haarlemmermeer.

Lalanga, about 9 miles east-south-eastward of Tanjong Saoesoe, is an extensive reef, which dries, and plainly marked by discoloration when covered; it is steep-to except on its eastern side, where there are three small reefs, which dry, and an 8-foot (2^{m}4) patch. There is a stage for the use of fishermen on the main reef. A reef, marked by a white beacon, surmounted by a ball, lies about one mile southward of Lalanga.

A small coral reef, which partly dries, lies about 4½ miles northward of Tanjong Saoesoe; it is marked by a white beacon surmounted by a ball. A reef, with a depth of 2 feet (0^{m}6) over it, lies about half a mile west-north-westward of this drying reef. A reef, with a depth of 15 feet (4^{m}6) over it, lies on the edge of the 100-fathom (182^{m}9) line, about 2 miles north-westward of Tanjong Saoesoe.

Except for a reef, with a depth of 5 feet (1^{m}5) over it, lying about one mile north-westward of Tongkoe, a village about 36 miles south-westward of Tanjong Api, there are no other dangers outside the 100-

Charts 942a, 1263, 2759a.

Chart 3240.

fathom (182^{m}9) line in Bocht van Poso; the dangers within this depth are mentioned in their appropriate places hereafter.

Eastern shore of Bocht van Poso.—Dangers.—Anchorages.—For Labuan Blanda, *see* page 578. Anchorage may be obtained by vessels with local knowledge off Morowo village, about 14½ miles south-westward of Tanjong Api, in a depth of 22 fathoms (40^{m}2). There are large coconut plantations in the vicinity of this village and also at Bongka, about 4½ miles farther south-westward; the bottom off the latter village is too steep for anchorage.

Chart 2195, plan of Tojo road.

Todjo (Tojo) village (*Lat. 1° 17′ S., Long. 121° 11′ E.*), an export place for forest produce, is situated about 22 miles south-westward of Bongka and on the southern side of the mouth of Todjo (Tojo) rivier; Baroe village is situated on the northern bank of the river. Steep mountains rise immediately behind the narrow strip of land on which these two villages stand, and the narrow valley of Todjo rivier gives access to the interior. The dwelling of the native prince stands in the middle of Todjo, and close to it is a mosque. The anchorage is in a depth of 15 fathoms (27^{m}4), and a vessel approaching it should steer for the rocky wall of Kandela. Vessels making for this anchorage from northward should take care to avoid the 5-foot (1^{m}5) reef lying about one mile north-westward of Tongkoe.

Chart 2195, plan of Banano road.

Banano village is situated on the northern side of the mouth of a rivulet flowing into a small bay about 5 miles south-south-westward of Todjo; on the southern side of the rivulet is a clump of coconut trees, where the village formerly existed. A reef, which dries, extends from Tanjong Laesi, the northern entrance point of the bay, and about 1¾ cables from the southern entrance point. Between these two coastal reefs is a detached reef, which dries, marked by discoloration, with a passage clear of dangers about 1¾ cables wide, with depths of from 10 to 17 fathoms (18^{m}3 to 31^{m}1), between it and the coast eastward.

Chart 3240.

Bataoewa village stands at the mouth of Sungei Bataoewa, about one mile south-westward of Banano.

Southern shore of Bocht van Poso.—Dangers.—Beacons.—Oëekoeli village is situated at the mouth of a small river about 5 miles south-westward of Banano, and a road leads from here to Tomori baai (page 544). The bay between Oëekoeli and Tanjong Lemo, about 4½ miles westward, is foul; although there are passages between the reefs, they should not be attempted without local knowledge. A barrier of reefs lies close inside the 100-fathom (182^{m}9) line as far westward as Tanjong Tiboe, a low point about 3 miles westward of Tanjong Lemo; a black beacon, surmounted by a cone, marks a reef about 1½ miles east-north-eastward of Tanjong Lemo, and a white beacon, surmounted by a ball, marks a reef lying about 3 cables west-north-westward of the black beacon. Two reefs, which dry, about 3 cables apart, lie just outside the 100-fathom (182^{m}9) line, about 1½ miles north-north-westward of Tanjong Lemo. Tanjong Lemo is a low point fringed by a reef, which extends about half a mile northward, and on the northern edge of which is a rock which dries. Toliba village is situated about 1½ miles westward of Tanjong Tiboe.

A reef, with a depth of 3 feet (0^{m}9) over it, lies just within the

Chart 3240.

100-fathom (182$^{\text{m}}$9) line and about one mile northward of the mouth of Sungei Toliba, which flows out about 2¾ miles westward of Tanjong Tiboe; a small reef, which dries, lies about 3 cables off the mouth of this river. The coast westward is clear.

Tanjong Karawasa lies about 9 miles west-north-westward of Tanjong Tiboe, and the coast between Tanjong Karawasa and Tanjong Poetia, about 4¾ miles westward, is rocky and can be approached closely.

Chart 2195, plan of Poso road.

Reede Poso.—Light.—Reede Poso is bounded by the parallel of Tanjong Pemandingi (*Lat. 1° 22′ S., Long. 120° 44′ E.*), situated about 1¾ miles south-westward of Tanjong Poetia. Poso village, at the head of the bay entered between these two points, is the headquarters of a Government official. The roadstead is entirely exposed to northerly winds, and is not particularly good.

There is a pier, from the head of which a light is exhibited; there is a depth of 5 feet (1$^{\text{m}}$5) at the head of the pier.

Sungei Poso discharges on the south-western side of the village, and a reef, with a depth of about 2 feet (0$^{\text{m}}$6) at its outer end, extends about 1¾ cables from its mouth. There are numerous fish traps mostly near the mouth of the river. The river flows out from the large lake of that name, and has a width of about half a cable at its mouth, gradually decreasing to a quarter of a cable within, with depths of from 2¾ to 6½ fathoms (5$^{\text{m}}$0 to 11$^{\text{m}}$9); these depths are maintained up to Roemoeroe, which can be reached by praus in about two days during the dry season.

Large vessels should anchor in a depth of about 38 fathoms (69$^{\text{m}}$5), approaching with the anchor lowered, with the right bank of Sungei Poso bearing 180°; a strong current sometimes sets out from the river, in which case it is necessary to run a hawser to the shore. *See* view facing page 570.

There is a considerable rainfall throughout the entire year at Poso, but it seldom rains in the forenoon; thunderstorms are frequent and very heavy. There are regular land and sea breezes.

The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. A harbour doctor is stationed here.

Chart 2195, plan of Mapane road.

Reede Mapane.—Mapane village is situated at the head of a bay entered about 2¼ miles south-westward of Tanjong Pemandingi, and is a trading place for forest produce. Anchorage can be obtained here, in a depth of 33 fathoms (60$^{\text{m}}$4), about 2½ cables offshore, with a prominent tree near the village bearing 225° and 2¾ cables offshore; the depths decrease rapidly towards the village. *See* view facing page 570.

Chart 3240.

Western shore of Bocht van Poso.—Dangers.—Beacons.—Anchorage.—Tambarana baai is entered between a point about 10½ miles north-north-westward of Mapane village and Tanjong Tambarana, about 4 miles farther northward. A reef barrier lies just within the 100-fathom (182$^{\text{m}}$9) line off the bay, and one of these, lying about 2½ miles south-eastward of Tanjong Tambarana and with a depth of one foot (0$^{\text{m}}$3) over it, is marked by a white beacon, surmounted by a ball. A reef, with a noticeable tree on it, lies about

Charts 2636, 941b, 942a, 1263, 2759a.

Chart 3240.

one mile offshore and 2½ miles southward of Tanjong Tambarana, and there are several reefs close offshore.

Small vessels can obtain anchorage in a basin in the coastal reef off Pebengko village, about 6 miles northward of Tanjong Tambarana, but owing to the reefs off the entrance, and an 8-foot ($2^{m}4$) patch inside the basin, local knowledge is essential.

Chart 2195, plan of Tambu bay.

Baai van Tamboe (Tambu), entered about 2½ miles north-north-westward of Pebengko, can be easily identified by a white sandy beach on its northern side; anchorage can be obtained in the entrance to the bay, in a depth of 17 fathoms ($31^{m}1$), but the inner part is only available for praus. There is only one dwelling on the shore of the bay, otherwise this stretch of coast is deserted.

Chart 3240.

WESTERN SHORE OF GOLF VAN TOMINI.—Coast.— Tanjong Saoesoe and Tanjong Pondindilisa (*Lat. 0° 55′ S., Long. 120° 24′ E.*), about 7½ miles north-westward, are low points, but are covered with high trees. Pondindilisa, 1,310 feet ($399^{m}2$) high, about 5 miles westward of Tanjong Saoesoe, is a prominent landmark from north-westward; about 1½ miles south-eastward of Pondindilisa is a lower round hill.

Off-lying reefs.—Beacons.—The 100-fathom ($182^{m}9$) line lies as much as 4 miles from the coast northward of Tanjong Pondindilisa, and just within is a barrier reef which continues, with a few wide openings, to Tanjong Makatata, a low point covered with high trees, about 12½ miles north-westward. A black beacon, surmounted by a cone, stands on the outer edge of a reef lying about 2½ miles northward of Tanjong Pondindilisa, and a similar beacon marks the north-western extremity of a reef about 5 miles northward of Tanjong Makatata.

There is a safe inshore passage for vessels with local knowledge between Tanjong Saoesoe and Tanjong Makatata, and directions for it are given on page 582.

Anchorages.—Anchorage can be obtained by vessels with local knowledge, in a depth of 30 fathoms ($54^{m}9$), off Pioree village, about one mile westward of Tanjong Saoesoe, and also southward of this point; care should be taken to avoid the reef with a depth of 15 feet ($4^{m}6$) over it, nearly 2 miles north-westward of Tanjong Saoesoe. Sungei Saoesoe flows out at this point, and the muddy water from it often creates patches of discoloured water, giving the false impression of reefs. About 3 miles westward of Tanjong Saoesoe the coastal reef extends three-quarters of a mile eastward, and a channel, with depths of from 11 to 14 fathoms ($20^{m}1$ to $25^{m}6$), runs along its southern edge and leads to a basin with a depth of 16 fathoms ($29^{m}3$) in it.

Tindaki village, about 7½ miles westward of Tanjong Pondindilisa, is a collecting place for forest produce, but is not visible from seaward; anchorage can be obtained by vessels with local knowledge off the mouth of a small river here, in a depth of 20 fathoms ($36^{m}6$), but the bottom is tolerably steep.

The coast between Tanjong Saoesoe and Tanjong Makatata is sparsely populated.

Chart 2194, plan of Parigi road.

Reede Parigi.—Light.—Dangers.—Beacon.—Lodji (Loji) vill-

Chart 2194, plan of Parigi road.

age stands on the coast about 3 miles north-westward of Tanjong Makatata, and the outer end of the road leading to the main village Parigi mpuöe, situated about 4 miles inland, is visible from seaward; in Lodji village are the remains of the old fortifications built by the East India Company, in 1730. Masigi village, the residence of a native princess, is situated close south-westward of Lodji.

Reede Parigi is bounded by a line drawn at a distance of 875 yards (800^{m}1) from, and parallel with, the beach, between lines drawn in an 070° direction from positions 2¾ cables, northward, and southward, of the end of the road leading to Parigi mpuöe.

A light is exhibited, at an elevation of 20 feet (6^{m}1), from a white iron framework structure, 19 feet (5^{m}8) in height, on the beach at Lodji. A black beacon, surmounted by a cone, marks the north-eastern edge of the coastal reef on the southern side of the anchorage.

There is a pier, with a depth of 5 feet (1^{m}5) alongside its **T**-head.

The bottom is very steep off Lodji, and, if the weather conditions are unfavourable, it is advisable to await calmer weather in the inshore passage between Tanjong Saoesoe and Tanjong Makatata (*Lat. 0° 50′ S., Long. 120° 13′ E.*). Vessels should approach the roadstead by steering for the road leading to Parigi mpuöe, bearing 270°; a flag is usually displayed near this road when a vessel is approaching. With about 40 fathoms (73^{m}2) of cable out, the anchor will take in fairly good holding ground opposite a break in the coastal reef, although very close to this reef; care should be taken, however, to avoid the 26-fathom (47^{m}6) depth, about 3 cables north-eastward of the beacon, if the anchor is lowered. Anchorage may also be obtained, in a depth of about 26 fathoms (47^{m}5), with the light-structure bearing 238°, distant 3½ cables. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3240.

Directions.—There are two routes for vessels proceeding to Parigi from Poso or Mapane. The outer route, outside the 100-fathom (182^{m}9) line, is generally taken by vessels with little knowledge of the locality; on this route vessels pass westward of the white beacon on the detached part of Lalanga, thence southward of the white beacon marking the reef about 4½ miles northward of Tanjong Saoesoe, and northward of the two black beacons marking the outer reefs northward of Tanjong Pondindilisa and Tanjong Makatata, respectively.

For the inshore passage, after passing westward of Lalanga, a vessel with local knowledge should steer for Tanjong Pondindilisa, bearing 291°, which leads into the channel between the barrier reef and the coast. When Tanjong Saoesoe bears 129°, she should keep it astern on this bearing, and then steer for Tindaki village when it bears 255°; when the south-eastern summit of Mount Pondindilisa bears 125° she should keep it astern on this bearing, which leads through the narrow passage between Tanjong Makatata and a white beacon, surmounted by a ball, marking the southern extremity of a rock covered with vegetation, three-quarters of a mile northward of this point. The reefs are all plainly marked by discoloration.

Coast.—The coast between Lodji and Kasimbar, about 41 miles northward, is of little importance, and the few anchorages, described hereafter, are only visited by native coasting vessels and the small vessel of the Gorontalo Trading Company.

Charts 2636, 941b, 942a, 1263, 2759a.

Chart 2636.

About 21 miles north-westward of Lodji is a summit, 5,424 feet ($1,653^{m}2$) high, which forms the southern end of a high ridge of mountains terminating about 5 miles south-westward of Kasimbar in a rounded summit, 3,544 feet ($1,080^{m}2$) high; northward of the latter is a range of low hills, forming a striking contrast.

Chart 3240.

There is no barrier reef along the 100-fathom ($182^{m}9$) line off this part of the coast, but numerous detached reefs lie within this depth.

Chart 2194, plan of Labua Sore.

Anchorages.—Light.—Laboea (Labua) Sore, about 11 miles north-westward of Lodji, is a basin in the coastal reef, with depths of over 10 fathoms ($18^{m}3$), entered by a passage about half a cable wide, with a depth of 23 feet ($7^{m}0$); the basin affords safe anchorage for small vessels, and its position can be readily identified by the yellowish hill Laboea Sore (chart 3240), 884 feet ($269^{m}4$) high, rising just behind.

Chart 2195, plan of Ampibabo road.

Ampibabo village is situated on the coast about 11½ miles northward of Laboea Sore, and the 100-fathom ($182^{m}9$) line lies nearly 2 miles from the coast here, embracing a number of reefs, which dry, and the two wooded coral islets Dii (*Lat. 0° 27′ S., Long. 120° 05′ E.*) and Dongkala; the former is visible at a distance of 10 miles from northward or southward. There is good anchorage off the village, in a depth of about 16 fathoms ($29^{m}3$), over a hard bottom, with Dongkala just open of the coast, which should be approached from southward with the point immediately northward of the village bearing 005°; vessels making for the anchorage from northward should pass close eastward of four reefs, which dry, lying about 2 cables offshore northward of Dongkala, and thence close eastward of that islet.

Chart 3240.

Toeriboeloe village is situated at the mouth of a rivulet about 10 miles northward of Ampibabo; Tanjong Toeriboeloe, immediately northward of the village, is sharply defined against the high mountainous land, and has a coconut plantation on its extremity. Vessels with local knowledge anchoring off this village should steer for the mouth of the rivulet, bearing 235°, with about 40 fathoms ($73^{m}2$) of cable out, and proceed in until the anchor holds, at about 1½ cables offshore, when a hawser should be taken to the shore. There is, however, better anchorage in the bight close northward of Toeriboeloe. A light is occasionally exhibited on a coconut tree on the beach at Toeriboeloe.

Anchorage may be obtained by vessels with local knowledge north-eastward of Donggoeloe village, situated about 2 miles north-westward of Toeriboeloe, in a depth of 20 fathoms ($36^{m}6$); a reef, with a depth of 10 feet ($3^{m}0$) over it, lies about 3 cables eastward of the village, and the coastal reef southward extends about 2 cables offshore.

Coast.—Between Kasimbar and Kaboe Kaboe, a village about 25 miles north-north-eastward, there is again a broken barrier reef just within the 100-fathom ($182^{m}9$) line, but there are no known dangers outside. There are no conspicuous summits for fixing a vessel's position when some distance from the coast, but the low hilly land behind Kasimbar, between the high mountainous land both northward and southward, is a very striking feature. Tanjong Sene, nearly 8 miles north-north-eastward of Kasimbar, and Tanjong Lemo, about 10 miles

Chart 3240.

farther northward, are low and flat; between the latter point and Kaboe Kaboe the coast is generally high.

This part of the coast is little visited, except by small local steamers from Gorontalo. Menelili, nearly 13 miles north-north-eastward of Kasimbar, is the principal village and is the residence of the prince of the Sigenti district.

Anchorages.—Beacons.—There is a safe and easy route for vessels with local knowledge within the barrier reef along the 100-fathom ($182^{m}9$) line, but it must be borne in mind that, although the reefs lying near this route are plainly marked by discoloration, they are too steep-to for soundings to give any warning.

Anchorage can be obtained by vessels with local knowledge, in a depth of 24 fathoms ($43^{m}9$), eastward of Kasimbar village; the anchorage should be approached from southward by steering for the point about 2 miles northward of the village, bearing 342°, crossing the 100-fathom ($182^{m}9$) line on this bearing. A coral reef, which dries, lies on the southern side of the roadstead and about 3 cables offshore; a reef, with a depth of 12 feet ($3^{m}7$) over it, lies about 1½ miles eastward of the village, and is marked by a white beacon, surmounted by a ball.

Taäda village (*Lat. 0° 03′ S., Long. 120° 02′ E.*) lies about 5½ miles northward of Kasimbar and on the northern shore of a bay encumbered with reefs; when the reefs are plainly visible vessels with local knowledge can anchor off the mouth of a rivulet near the village, proceeding on a westerly course along the northern shore of the bay.

Anchorage can be obtained by vessels with local knowledge, in a depth of 27 fathoms ($49^{m}4$), east-south-eastward of Menelili village. There are numerous reefs off the village.

Anchorage can be obtained by vessels with local knowledge in the bight between Menelili and Tanjong Lemo, in a depth of 15 fathoms ($27^{m}4$), but, owing to the numerous reefs, vessels of any size should remain farther outside.

Vessels proceeding to any of the above anchorages by the inshore passage from the anchorage off Kasimbar should steer 030°, so as to pass about one mile south-eastward of Tanjong Sene, and thence steer for Tanjong Lemo when it bears 000°.

A white beacon, surmounted by a ball, marks a reef, which dries, lying about 2 miles north-eastward of Tanjong Lemo. An unofficial black beacon marks a reef about 2 miles eastward of Tanjong Lemo, and another similar unofficial beacon is situated off Melanggo, a village about one mile northward of Tanjong Lemo; these unofficial beacons mark the channel to Melanggo.

Coast.—Dangers.—Northward of Kaboe Kaboe the 100-fathom ($182^{m}9$) line approaches the coast, and the barrier reef ends. The following are prominent landmarks on the coast between Kaboe Kaboe and Tomini, about 27 miles north-eastward: a dark hill, 177 feet ($53^{m}9$) high, close to the coast about 4½ miles north-eastward of Kaboe Kaboe; and a clump of dark trees close southward of Tenombo and about 10 miles north-eastward of Kaboe Kaboe. Ogoamas gebergte, 9,555 feet ($2,912^{m}4$) high, about 17 miles northward of Kaboe Kaboe, is visible as far southward as Taäda under favourable conditions, but the summit is often obscured by clouds. The deep saddle between the peaks, with elevations of 8,925 feet and 9,555 feet

Charts 942a, 1263, 2759a.

Chart 3240.

(2,720^{m}3 and 2,912^{m}4), is very noticeable. Piek van Tomini, 5,785 feet (1,763^{m}3) high, about 4 miles north-westward of Tomini, is conical and very prominent. Bosago, about 13 miles east-north-eastward of Piek van Tomini, is 4,417 feet (1,346^{m}3) high, and also very prominent.

Tanjong Pelasa, about 19½ miles north-eastward of Kaboe Kaboe, is low. A reef, with a depth of 4 feet (1^{m}2) over it, and a 26-foot (7^{m}9) patch lie about 3 miles south-eastward and 3¼ miles east-south-eastward, respectively, of Tanjong Pelasa.

Anchorages.—Off Sidoa village, about 2½ miles north-eastward of Kaboe Kaboe, there is anchorage for vessels with local knowledge, in a depth of 15 fathoms (27^{m}4), southward of a reef with a depth of 5 feet (1^{m}5) over it, lying about 2½ cables south-eastward of the village. There is also anchorage for vessels with local knowledge off Dongkasa village, about 5 miles north-north-eastward of Sidoa. A reef, with a depth of 3 feet (0^{m}9) over it, lies about half a mile southward of Dongkasa and about 1¾ cables offshore; there is a least depth of about 8 fathoms (14^{m}6) between this reef and the coast. The coastal reef projects about 2¾ cables from Tanjong Silabia, situated close north-eastward of Dongkasa.

Tenombo village is situated in a valley close northward of the clump of dark trees previously mentioned; temporary anchorage can be obtained here by vessels with local knowledge, approaching with about 45 fathoms (82^{m}3) of cable out until the anchor holds, and then making use of a landfast, but the anchorage is considered unsafe. Tenombo is the headquarters of a Government official, and the Rajah of Moöetong frequently resides here; the roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

The roadstead is bounded by a line drawn at a distance of 2¾ cables from, and parallel with, the beach, between the parallels of lat. 0° 22′ 40″ N. and lat. 0° 23′ 38″ N.

Outlying danger.—Beacon.—Raaf, a reef with a depth of 3 feet (0^{m}9) over it, and marked by discoloration, lies about 5½ miles southward of Tanjong Pelasa (*Lat. 0° 27′ N., Long. 120° 25′ E.*); it is very steep-to, and is marked by a black beacon, surmounted by a cone.

NORTHERN SHORE OF GOLF VAN TOMINI.—Between Tanjong Tombalilatoe, the northern entrance point of Golf van Tomini, and Baai van Limba, about 50 miles west-north-westward, the mountains rise steeply from the sea and the 100-fathom (182^{m}9) line lies close off the coast, with no dangers except an occasional coastal reef. Westward of Baai van Limba the 100-fathom (182^{m}9) line lies farther offshore, and a barrier reef, with numerous islets, lies just within; along the western half of this barrier, as far westward as Tanjong Pelasa, there are several dangers outside the 100-fathom (182^{m}9) line. The reefs both inside and outside the 100-fathom (182^{m}9) line are steep-to, and sounding is of little value for identifying their positions; they are, however, generally marked by discoloration, and many of them dry. The coast eastward of Tanjong Tombalilatoe is described on page 598.

During the south monsoon the mountains exceeding an elevation of about 3,000 feet (914^{m}4) are obscured by clouds except in the early morning, and, in any case, the summits are not always easy to identify; the various points of land are, however, mostly sharply defined.

Charts 942a, 1263.

Chart 2195, plan of Gorontalo river.

Reede Gorontalo.—Light.—Buoyage.—Gorontalo, about 22 miles north-westward of Tanjong Tombalilatoe and the principal trading place for Golf van Tomini, is situated on the low tongue of land formed at the junction of the Bolango and Bone, the principal tributaries of Gorontalo rivier, which flows into Baai van Gorontalo. The town contains the residence of the Government official. On both sides of the mouth are steep mountain ranges, and behind the town is an extensive plain; the cleft thus formed is visible from a considerable distance.

A light is exhibited, at an elevation of 119 feet ($36^{m}3$), from a white iron framework structure, 19 feet ($5^{m}8$) in height, situated close within the eastern entrance point of the bay.

There is a landing stage on the eastern side of the roadstead, about 2 cables northward of the light-structure, and there is a pier and a flagstaff on the western side, about 4 cables north-westward of the light-structure. There is a concrete house, on the point immediately below the light-structure, which is prominent.

The roadstead, which is bounded by a line drawn in a 292° direction from the light-structure and by the parallel of the pier, affords indifferent anchorage on account of the confined space, great depths, and the strong current from the river. If there is a strong wind it is advisable to anchor outside, in a depth of about 44 fathoms ($80^{m}5$), about one cable outside the 5-fathom ($9^{m}1$) line, with the light-structure bearing about 040°. Outside the entrance there is sometimes a strong stream setting across, which is usually west-going. As there are no pilots local knowledge is desirable.

In the south monsoon, especially in July and August, there is a strong wind from seaward, causing a sea along the western side of the bay; this wind generally sets in at about 0900, and continues through the day until about 1800, when it is replaced by the land wind and the sea is then calm. In the north monsoon the sea breeze is light, or sometimes entirely absent, but heavy squalls from seaward sometimes occur unexpectedly; otherwise there is a land wind, considerably stronger at night than during the day.

There is a white conical buoy close north-north-westward, and a mooring buoy about one cable north-north-westward of the landing stage, and there are four anchors embedded on the eastern shore as landfasts.

The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, and a local steamer visits places in Golf van Tomini. Gorontalo (*Lat. 0° 31′ N., Long. 123° 03′ E.*) is connected to the general telegraph system. Provisions and water are scarce.

Coast.—Anchorages.—The coast between Gorontalo and Tilamoeta, about 43 miles westward, is of little importance to shipping. Except in the bays described hereafter there is no anchorage, as there are great depths close up to the coast.

Chart 2718, plan of Paguyama river entrance.

Baai van Pagoejama (Paguyama), the eastern entrance point of which lies about 22 miles westward of Gorontalo, has great depths, a sounding of over 300 fathoms ($548^{m}6$) having been obtained in the middle. Sungei Pagoejama (Paguyama) flows into the north-western corner of the bay, and a small vessel can anchor off its mouth, but

Chart 2718, plan of Paguyama river entrance.

there is little room to swing; Bilatoe (Bilatu) village, on the eastern side of the mouth, is a collecting place for forest produce.

Chart 3240.

Baai van Bobaä, entered about 5 miles westward of the western entrance point of Baai van Pagoejama, affords excellent anchorage for vessels with local knowledge, in a depth of 22 fathoms (40^{m}2); the entrance is only about 2 cables wide between the reef extending from either side, but they are well marked by discoloration.

Chart 2718, plan of Limba bay.

Baai van Limba, close westward of Baai van Bobaä, is divided into two parts by Limba, a densely wooded island, 444 feet (135^{m}3) high, connected by a narrow passage, which dries, at the northern end of the island. There is very good anchorage, in a depth of about 23 fathoms (40^{m}1), in the eastern part, but it is not well sheltered during the south monsoon. The entrance to the eastern part of the bay is only about one cable wide between the reefs on either side extending from Tanjong Bobaä, the eastern entrance point and from the south-eastern side of Limba. A hut at the head of the bay in line with a small peak, bearing 343°, leads midway between these reefs.

The entrance to the western part of the bay, westward of Limba is narrow and tortuous; there is, however, sheltered anchorage in a depth of about 14 fathoms (25^{m}6), off the north-western side of Limba.

Chart 2718, plan of Dulupi road.

Baai van Doeloepi (Dulupi), entered between a point 3½ miles westward of Limba and Doeloepi (Dulupi), an island with two hills, 346 and 293 feet (105^{m}5 and 89^{m}3) high, respectively, about 6 cables farther westward, affords sheltered anchorage in the north monsoon. If the coastal reefs are not visible, or in thick weather, it is not advisable to enter the bay; a 6-fathom (11^{m}0) patch lies in the middle of the entrance. In the south monsoon vessels should proceed into the inner part of the bay, northward of Doeloepi, but there is little space. Doeloepi (Dulupi) village is situated at the mouth of a rivulet on the northern shore of the bay; there is a good landing place on the beach near the village.

Charts 2718, plan of Tilamuta harbour, 900.

Baai van Tilamoeta and approaches.—Dangers.—Beacon.— Baai van Tilamoeta (Tilamuta), entered about 4¾ miles westward of Doeloepi (*Lat. 0° 29′ N., Long. 122° 26′ E.*), affords good anchorage, in a depth of 20 fathoms (36^{m}6) mud, although the space is somewhat constricted. The reef which fringes the bay is marked by discoloration, except that extending southward near the village. Tilamoeta (Tilamuta) village, consisting of a few houses, is situated at the head of the bay, and is a trading place for products from the surrounding district. There is a pier, with steps, which dries at very low water. The bay is occasionally visited by vessels of the Koninklijke Paketvaart Maatschappij. The hilly island Tapata Daä is almost connected to the western shore of the bay, and Tapata Kiki is a small islet on the coastal reef southward of Tapata Daä.

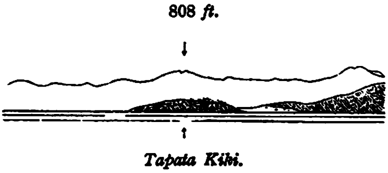
Lahengo and Asiangi are low densely wooded islands lying about one mile eastward and 4 cables southward of the eastern and western entrance points of the bay, respectively. Mohoepombo (Mohupombo) Daä, Mohoepombo (Mohupombo) Kiki, Mopingoelo (Mopingulo), Telefoa and Tangoeloemato (Tangulumato) are low, densely wooded

Charts 942a, 1263.

Charts 2718, plan of Tilamuta harbour, 900.

islands lying just within the 100-fathom (182^{m}9) line in the southern approach to Baai van Tilamoeta; the north-eastern extremity of Mohoepombo Daä, situated three-quarters of a mile south-eastward of Asiangi, is a very prominent yellow rocky point and a black beacon, surmounted by a cone, marks the northern extremity of the reef extending about 8 cables north-eastward from this island.

Directions.—A vessel making for Baai van Tilamoeta from eastward, should bring the summit of a hill, 808 feet (246^{m}3) high, situated nearly 7 miles westward of Tilamoeta village, in line with Tapata Kiki, bearing 275°; this alignment leads northward of the black beacon on the extremity of the reef extending north-eastward from Mohoepombo Daä, and southward of two reefs, with depths of 23 and 16 feet (7^{m}0 and 4^{m}9) over them, respectively, lying nearly three-quarters of a mile south-westward of Lahengo. These reefs cannot be discerned from a distance so that it is advisable to keep nearer the beacon. The bay can then be entered on a north-westerly course.


808 ft.
Tapata Kiki.

808-foot hill in line with Tapata Kiki, bearing 275°.

(*Original dated prior to* 1934.)

A vessel from westward can approach Baai van Tilamoeta by the inner passage within the barrier reef, keeping about one mile off Batoemoito (page 589); after passing between Asiangi and Mohoepombo Daä she may steer for the entrance to the bay when the eastern extremity of the latter island bears 191°, so as to avoid a detached reef, with a depth of 11 feet (3^{m}4) over it, lying about 3 cables eastward of Asiangi.

A vessel from westward approaching outside the barrier reef can cross this barrier between Telefoa and Mopingoelo, situated about 3¾ miles west-south-westward and 2 miles south-westward of Asiangi, respectively; the reef extending eastward from Telefoa is plainly marked by discoloration, and the vessel should hold fairly close along this reef, so as to pass westward of a 17-foot (5^{m}2) patch lying about one mile westward of the southern extremity of Mopingoelo.

Chart 900.

Coast.—There are no bays of importance in the coast between Asiangi (*Lat. 0° 29′ N., Long. 122° 21′ E.*) and Tanjong Pandjang (Panjang), about 34 miles westward. Vessels passing outside the barrier of islets and reefs, lying just within the 100-fathom (182^{m}9) line, will find no lack of landmarks for fixing their position, although in the south monsoon a great part of the mountainous land is obscured from 0800 for the remainder of the day.

With good visibility the following mountains are easily identified: Tiolo, about 8¼ miles north-westward of Asiangi, is the highest summit of a long chain, and has a double peak, 3,328 feet (1,014^{m}3) high. Doelantangan (Dulantangan), about 18½ miles westward of Asiangi, is 1,819 feet (554^{m}4) high, and the highest summit of a ridge running

Charts 3240, 942a, 1263.

Chart 900.

at a distance of about 2 miles from the coast. Siroepoe (Sirupu), about 4¾ miles northward of Doelantangan, has a rounded summit. Baginte or Kapala Doea, about 4½ miles south-westward of Siroepoe, is a tolerably steep cone, 2,652 feet (808$^{\mathrm{m}}$3) high. Oleonoehe (Oleonuhe), about 9½ miles westward of Baginte, is noticeable owing to its isolated position. Dapi gebergte, 5,562 feet (1,695$^{\mathrm{m}}$3) high, about 7 miles northward of Baginte, is the highest and most distant range visible.

Within the barrier off the coast between Baai van Tilamoeta and Tanjong Pandjang there is a passage which is easily navigated; the various reefs within the barrier are all plainly marked by discoloration, and there are numerous landmarks. In many places there are passages through the barrier, by which some of the villages can be reached direct; these are shown on chart No. 900, and are mentioned hereafter in the description of the anchorages. The edges of the barrier reefs are marked by discoloration, and many of the reefs dry; the smaller islets are merely bare sandbanks, and the larger ones are mostly low and thickly wooded. Lahei, the westernmost islet on this part of the barrier, lies about 9 miles eastward of Tanjong Pandjang and is not so thickly wooded as the remainder. Tanjong Boeloöliho (Buloöliho), about 12 miles westward of Asiangi, is a prominent point with a hillock on it, 210 feet (64$^{\mathrm{m}}$0) high; Tanjong Pandjang is low, and may be identified by a group of casuarina trees on it.

Anchorages.—Dangers.—Beacons.—Batoemoito (Batumoito) village stands at the head of a small bay about 3 miles westward of Baai van Tilamoeta and northward of the passage between Telefoa and Mopingoelo; reefs extend from both entrance points, and the inlet between is only available for small vessels.

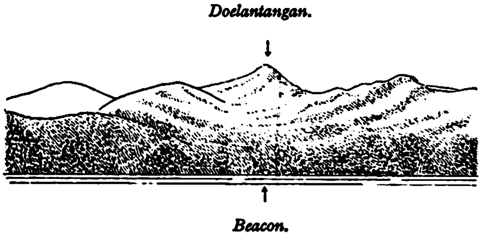
Anchorage may be obtained, in a depth of not less than 15 fathoms (27$^{\mathrm{m}}$4), off Tapadaä village, about 8 miles westward of Tilamoeta. A vessel from seaward should approach through the barrier close westward of Montoli, about 8 miles west-south-westward of Asiangi, with a small casuarina wood westward of the village, bearing 358°, passing between a 26-foot (7$^{\mathrm{m}}$9) patch just inside the barrier, on the east, and an 11-foot (3$^{\mathrm{m}}$4) patch, on the west, both of which cause heavy tide-rips; both patches are marked by discoloration. Only a few small huts can be seen on the beach at Tapadaä.

There is good anchorage for vessels with local knowledge, in depths of from 5 to 7 fathoms (9$^{\mathrm{m}}$1 to 12$^{\mathrm{m}}$8), off Boemboelan (Bumbulan) village, about 4 miles westward of Tanjong Boeloöliho; the houses, which have zinc roofs, are built on piles, and are very prominent. The islands Tomelo and Doelawono (Dulawono), lying in the bight between Tanjong Boeloöliho and Boemboelan, are partly cultivated. Vessels proceeding to the anchorage off Boemboelan can cross the barrier with Doelantangan in line with a white square beacon on the beach, bearing 322°, passing close north-eastward of a black beacon, surmounted by a cone, on the extremity of the reef extending 8 cables south-eastward from Bitila (*Lat. 0° 24′ N., Long. 122° 06′ E.*), an islet lying about 3¾ miles south-south-westward of Tanjong Boeloöliho. About 2½ miles north-north-westward of Bitila, and close north-eastward of the leading line, is a shoal with a depth of 19 feet (5$^{\mathrm{m}}$8) over it, marked by a white beacon, surmounted by a ball; farther inside, directly on the leading line and about one mile from the white beacon on the

Charts 3240, 942a, 1263.

Chart 900.

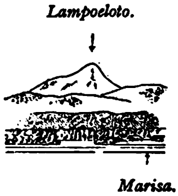
beach, is a shoal with a depth of 14 feet ($4^{m}3$) over it, marked by a white beacon, surmounted by a ball. A reef, with a depth of one foot ($0^{m}3$) over it, lies about 6 cables east-south-eastward of the white beacon at Boemboelan (*Lat. 0° 28′ N., Long. 122° 04′ E.*), and is marked by a white beacon, surmounted by a ball. There are many other dangers north-eastward of the line joining these three white beacons. The reefs are barely marked by discoloration owing to the muddy water.



Doelantangan in line with beacon, bearing 322°.

(*Original dated prior to* 1934.)

Marisa village is situated about 8½ miles west-south-westward of Boemboelan, at the mouth of Sungei Milangotaloehoe (Milangotaluhu), formed by the junction of Sungei Marisa and Sungei Botoedoelanga and is prominent; the name Marisa applies to the small village on the coast as well as the main village, situated a short distance up the river. Copra and forest produce are exported, and a few provisions are obtainable. The islets Pomoliia Daä and Pomoliia Kiki lie within half a mile of Tanjong Tamboö, a point about 2½ miles eastward of Marisa; a white beacon, surmounted by a ball, marks the southern edge of a reef lying about 3 cables south-eastward of Pomoliia Kiki. There is anchorage southward of the mouth of Sungei Milangotaloehoe, in depths of from 13 to 15 fathoms ($23^{m}8$ to $27^{m}4$), with Pomoliia Daä bearing 087°. The barrier can be crossed between Lahei and a reef, with a depth of 3 feet ($0^{m}9$) over it, marked by a black beacon, surmounted by a cone, lying about 2 miles westward; to pass through this passage a vessel should steer for Lampoeloto (Lampuloto), 3,013 feet ($918^{m}4$) high, situated about 11 miles northward of Marisa village, bearing 000°, and, when closer in, the mouth of the river will be seen in line with Lampoeloto on this bearing.



Lampoeloto, bearing 000°.

(*Original dated prior to* 1934.)

Sungei Randangan flows out nearly 1½ miles westward of Marisa, and is the principal river along this part of the coast. It has a marshy delta, with three mouths, but only the two western are of any importance; these unite about half a mile up, where the river is about a quarter of a cable wide, with an average depth of 2½ fathoms ($4^{m}6$); the western of these two mouths, which has depths of from 2½ to 3 fathoms ($4^{m}6$ to $5^{m}5$), is the best entrance to use. A steep-to bank of sand and mud extends about 3 cables from the coast near the mouth of the river; a channel leads through this bank towards the middle mouth, and unites, close to the shore, with the channel from

Charts 3240, 942a, 1263.

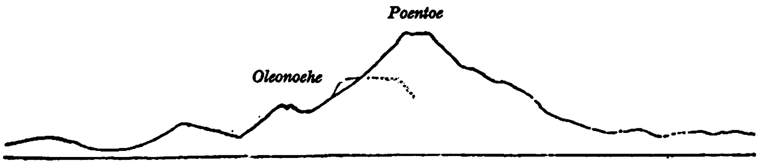
Chart 900.

the western mouth. In 1899, the depth on the bar was 4 feet (1m2). Pasi Pilato, a reef, which dries, about 1¼ miles south-eastward of Tanjong Pandjang, can always be distinguished. A 15-foot (4m6) patch and a 19-foot (5m8) patch lie about three-quarters of a mile south-eastward and southward, respectively, of the point and a shoal, with a least depth of 14 feet (4m3) over it, lies about 1½ miles west-south-westward.

Coast.—Between Tanjong Pandjang (*Lat. 0° 24′ N., Long. 121° 48′ E.*) and Tanjong Tolosiaje, about 22 miles westward, the coast forms a wide bight, which is, however, greatly encumbered with islands and reefs. Along the coast is a narrow, marshy strip, with mountains rising abruptly behind. The following are the most prominent summits :—Timboale, 2,596 feet (791m3) high, Patilangio, and Naima are three summits of a ridge, the middle of which lies about 10½ miles north-north-westward of Tanjong Pandjang. Oelota (Ulota), about 5½ miles north-westward of Naima, is 2,898 feet (883m3) high, and is the highest peak visible from seaward. Loemoeli (Lumuli), about 5 miles westward of Naima, is 1,789 feet (545m3) high. Angorasse, a hill with two summits, 468 feet (142m6) high, is situated on a peninsula about 3 miles southward of Loemoeli, and between Loemoeli and Angorasse are two steep hills, 752 and 789 feet (229m2 and 240m5) high. Beou (Beau), 3¾ miles westward of Loemoeli, is 2,363 feet (720m2) high, and is the highest summit of a group, from which a spur extends southward to the coast. Dingki, 4 miles northward of Tanjong Tolosiaje, has a saddle-shaped summit, 1,064 feet (324m3) high, and rises from low land. Njo (Nyo), about 7 miles west-north-westward of Dingki, is a summit of a range trending nearly parallel with the coast, about 5 miles inland. *See* views facing page 592.

The following islands in the bight are noticeable : Poentoe (Puntu), bordered by mangroves, lying near the coast about 7½ miles north-westward of Tanjong Pandjang, has a crater-shaped summit ; Poentoe (Puntu) Kiki, close off the north-western extremity of Poentoe, appears as part of the coast. Dodepo, forming part of the barrier reef, lies about 7 miles eastward of Tanjong Tolosiaje, and has a prominent tree on it. The remaining islands are low and covered with more or less high trees.

This part of the coast is sparsely populated, the only village of any importance being Papajato (Papayato), situated about 2¼ miles east-north-eastward of Tanjong Tolosiaje. There are some high trees on Tanjong Tolosiaje, and one of them, close to the beach, projects above the others.



North-western side of Oleonoehe, bearing 060°, just open north-westward of the north-western slope of the summit of Poentoe.

(*Original dated* 1947.)

The barrier reef can be crossed southward of Poentoe by keeping the

Charts 3240, 942a, 1263.

Chart 900.

western summit on Angorasse peninsula in line with the south-western side of Kiakiaso, an island about 3 miles westward of Poentoe, bearing about 315° (*see* view facing this page), but this alignment leads over a 26-foot ($7^{m}9$) patch about 2 miles south-eastward of Walea, an island lying about 2¼ miles south-south-westward of Poentoe. To avoid this patch the western summit on Angorasse peninsula should be kept in line with the north-eastern side of Walea, bearing about 318°, until a depth of less than 27 fathoms ($49^{m}4$) is obtained, when the first alignment should be resumed.

The barrier reef may also be crossed about 4½ miles farther west-north-westward, with the north-western side of Oleonoehe, bearing 060°, just open north-westward of the north-western slope of the summit of Poentoe.

Charts 2718, plan of Pajonge anchorage, 900.

Reede Padjonge.—Padjonge (Pajonge) Daä is a low island lying close to the coast 2¼ miles eastward of Papajato village; Padjonge (Pajonge) Kiki, also low, lies close westward of Padjonge Daä. There is convenient anchorage, in a depth of 12 fathoms ($21^{m}9$), mud, south-westward of Padjonge Kiki, with the summit of Poentoe in line with the middle of Lamoeoe Daä, bearing about 082°; Lamoeoe (Lamuu) Daä is a low island, covered with high trees, about 2 miles eastward of Padjonge Daä. Small vessels can obtain good anchorage between the two Padjonge eilanden. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Papajato village is built on piles, and is a collecting place for forest produce.

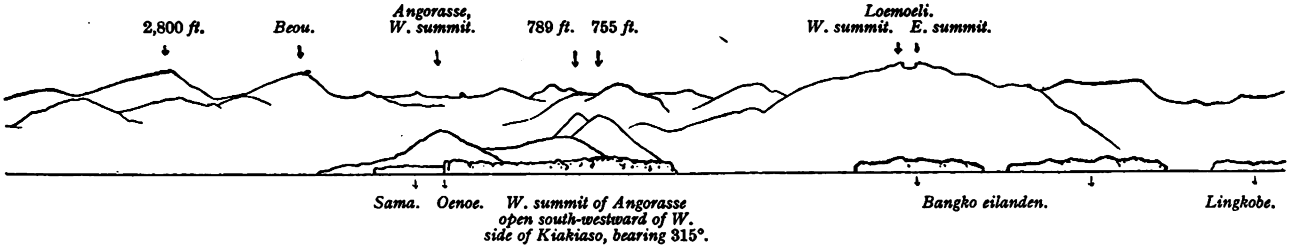
Chart 900.

Directions.—Dangers.—Beacons.—From eastward the usual route to Reede Padjonge lies well outside the 100-fathom ($182^{m}9$) line, and thence through the passage between the reefs extending from Dodepo and Sadaä (*Lat. 0° 26′ N., Long. 121° 31′ E.*); the latter is a wooded island about 2½ miles south-westward of Dodepo, and a black beacon, surmounted by a cone, stands on the north-eastern extremity of the reef extending 6 cables north-eastward from it. The leading mark for this passage is the 2,734-foot ($833^{m}3$) summit of a saddle mountain, about 4 miles eastward of Njo, in line with a house with a zinc roof, about one mile eastward of Papajato village, bearing 316°. This alignment leads very close to the reef extending from Sadaä, so that when nearing this island it is advisable to bring the 2,734-foot ($833^{m}3$) summit just open north-eastward of the house, passing thus north-eastward of the black beacon. *See* view facing this page.

Another route may be taken by small vessels with local knowledge from eastward, keeping outside the 100-fathom ($182^{m}9$) line, and, when southward of Poentoe, bringing Boloö in line with the southern side of Dodepo, bearing 284°; when nearing Dodepo on this alignment the saddle of Saloempengoe (Salumpengu) should be brought in line with a prominent tree about one mile north-eastward of Tanjong Tolosiaje, bearing 277°, which leads through the channel, about one cable wide and with a depth of 5 fathoms ($9^{m}1$), between Dodepo and Lamoeoe Daä. *See* view facing this page.

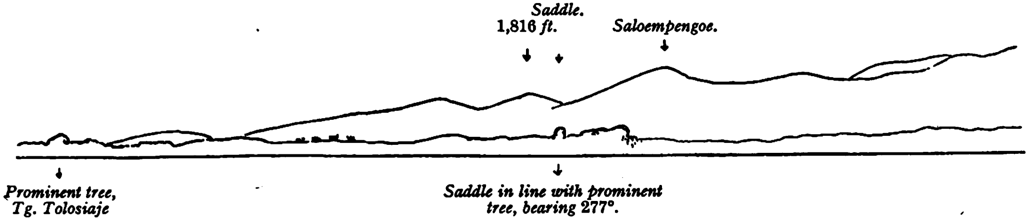
Approaching from westward, Naima in line with the north-western extremity of Lamoeoe Kiki, bearing 053°, leads outside all dangers; *see* view facing this page. By continuing on this leading mark the

Charts 3240, 942a, 1263.


2,800 ft.
Beou.
Angorasse, W. summit.
789 ft.
755 ft.
Loemoeli. W. summit. E. summit.
Sama.
Oenoe.
W. summit of Angorasse open south-westward of W. side of Kiakiaso, bearing 315°.
Bangko eilanden.
Lingkobe.

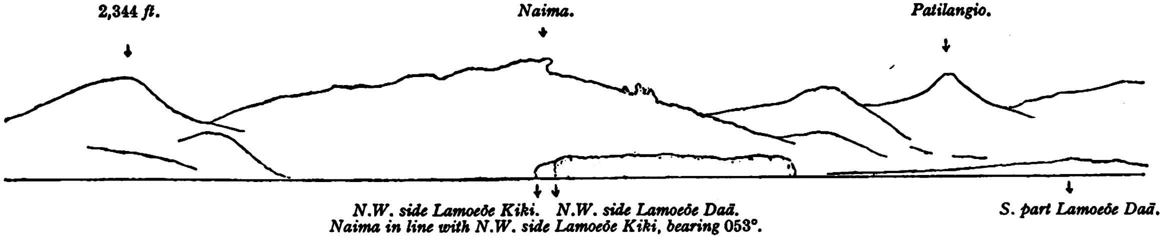
Golf van Tomini, northern shore. Approach to Reede Padjonge from south-eastward.

(*Original dated* 1931.)


Saddle.
1,816 ft.
Saloempengoe.
Prominent tree, Tg. Tolosiaje
Saddle in line with prominent tree, bearing 277°.

Golf van Tomini, northern shore. Approach to Reede Padjonge. Leading mark for channel between Dodepo and Lamoeöe Daā.

(*Original dated* 1931.)

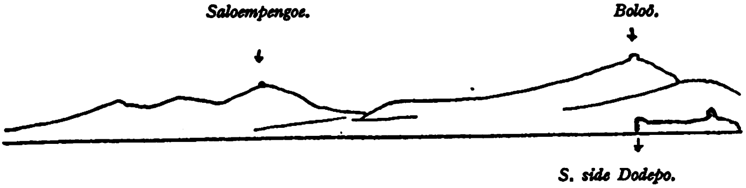


Golf van Tomini, northern shore. Leading mark for western approach to Reede Padjonge.

(*Original dated* 1931.)

Chart 900.

barrier can be crossed between the wooded island Sadii, about 3 miles south-south-eastward of Papajato, and a reef, which dries about three-quarters of a mile westward of Sadii (*Lat. 0° 26′ N., Long. 121° 30′ E.*);

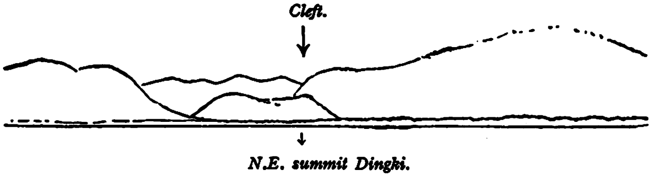


Boloö in line with the southern side of Dodepo, bearing 284°.

(*Original dated* 1931.)

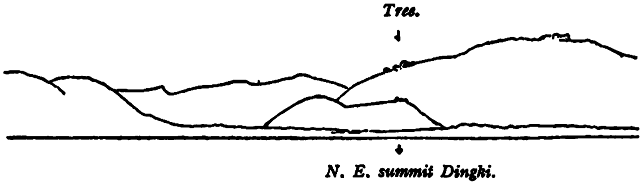
there is a depth of nearly 5 fathoms (9$^{\text{m}}$1) in this passage. A reef, with a depth of 2½ fathoms (4$^{\text{m}}$6) over it, lies about one mile northward of Sadii, and is marked by a white beacon, surmounted by a ball.

A reef, which dries, lies about 1¾ miles westward of Sadii, and there is a clear passage both eastward and westward of this reef. The eastern passage has a least depth of 38 fathoms (69$^{\text{m}}$5); a prominent cleft on the western slope of a saddle mountain 2,800 feet (853$^{\text{m}}$4) high, situated about 5 miles northward of Mount Dingki, in line with the north-east summit of Dingki, bearing 351°, leads through. The western passage has a depth of 17 fathoms (31$^{\text{m}}$1), and a prominent tree on the western slope of the above 2,800-foot (853$^{\text{m}}$4) saddle mountain in line with the north-east summit of Mount Dingki, bearing 003°, leads through; the western side of this passage is bounded by the reef extending eastward from the low, wooded island Ilosangi.



Prominent cleft in 2,800-foot mountain in line with the N.E. summit of Dingki, bearing 351°.

(*Original dated* 1931.)



Prominent tree on 2,800-foot mountain in line with the N.E. summit of Dingki, bearing 003°.

(*Original dated* 1931.)

Charts 3240, 942a, 1263.

Chart 900.

Reede Papajato.—The village proper is situated some distance inland, but there are some prominent houses with zinc roofs on the coast. Anchorage may be obtained off these houses, in a depth of about 16 fathoms ($29^{m}3$), sand, about three-quarters of a mile offshore.

Directions.—Danger.—Beacon.—Two routes lead to Reede Papajato from seaward; the eastern route leads through the opening in the barrier reef between Dodepo and Sadaä, the leading mark for which is given on page 592 for the approach to Reede Padjonge. After passing the beacon north-eastward of Sadaä the vessel may steer for the anchorage in Reede Papajato, passing north-eastward of the shoal with a depth of 15 feet ($4^{m}6$) over it, marked by a white beacon, surmounted by a ball, situated about one mile north-north-westward of Sadii.

The western route leads between the reef extending about one mile westward from Sadii and a detached reef, which dries, about three-quarters of a mile farther westward, with Dingki bearing about 340°, which leads to the anchorage.

Coast.—The coast between Tanjong Tolosiaje and Tanjong Toeladenggi (Tuladenggi), nearly 18 miles westward, is sparsely populated, Moöetong (Moutong), about 5½ miles north-eastward of the latter point, being the only village of any importance. Tanjong Doedeoeloe (Dudeulu), about 2 miles westward of Tanjong Tolosiaje, has a hamlet on it, close to a coconut plantation. The whole stretch of this coast is low except eastward of Moöetang, where spurs from the mountains approach the coast.

Off-lying islets and dangers.—Ilosangi and Iloloeta (Iloluta) are low wooded islets forming part of the barrier reef, about 2¾ miles southward and 3¼ miles south-south-westward, respectively, of Tanjong Tolosiaje; from Iloloeta the barrier reef just within the 100-fathom ($182^{m}9$) line continues to the low, wooded islet Doelangka (Dulangka), which lies on a large reef about 5½ miles west-south-westward. A reef, which dries, lies about 1½ miles west-north-westward of Doelangka, but thence to Lalaijo (Lalaiyo), an islet with low trees, 1½ miles southward of Moöetong, there is no barrier. A reef, which dries, with a sandbank above water on it, lies about one mile south-eastward of Doelangka.

Maloeangi (Maluangi), an islet covered with high trees, lies about 6 miles south-westward of Doelangka, on a plateau rising from great depths. Panabean is a similar islet lying on the north-eastern extremity of an extensive reef, about 1½ miles southward of Maloeangi; parts of this reef dry, and on other parts there are depths of only a few feet. About 6 miles westward of Panabean is an isolated reef, with a least depth of 13 feet ($4^{m}0$) over it, and about 2¼ miles west-north-westward of Maloeangi is an extensive reef, with a least depth of 7 feet ($2^{m}1$) over it.

Chart 2194, plan of Moutong road.

Reede Moöetong.—Dangers.—Beacons.—Moöetong (*Lat. 0° 27′ N., Long. 121° 13′ E.*) is a primitive village, situated at the mouth of a rivulet and is the residence of the Rajah of the Moöetong district, although he frequently stays at Tenombo. There is anchorage, in depths of from 11 to 16 fathoms ($20^{m}1$ to $29^{m}3$), southward of the village, keeping well clear westward of the numerous reefs. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Charts 3240, 942a, 1263.

Chart 2194, plan of Moutong road.

The following reefs are marked by unofficial beacons:—A white beacon stands on the south-western edge of the reef, which is marked by discoloration, extending about 2 cables from Lalaijo, and a similar beacon marks the western side of Lana Lana, a reef, with a depth of 5 feet (1^{m}5) over it, about half a mile northward of Lalaijo. A black beacon marks the eastern side of Sapaïda, a reef, which dries, about 8½ cables westward of Lalaijo. These three beacons mark one of the approach channels to the roadstead.

Chart 900.

Directions.—Beacon.—The safest route for approaching Reede Moöetong (Moutong) is outside the 100-fathom (182^{m}9) line, passing eastward of Panabean and Maloeangi, and thence through the channel westward of Lalaijo marked by the three unofficial beacons. Vessels with local knowledge can proceed between Reeden Papajato and Moöetong by an inshore passage within the barrier. A reef, marked by a white beacon, surmounted by a ball, lies in this passage about 3 miles east-south-eastward of Moöetong village.

Reede Toeladenggi.—Dangers.—An extensive reef, which dries, lies about three-quarters of a mile east-south-eastward of Tanjong Toeladenggi and there is anchorage for vessels with local knowledge, in depths of from 18 to 20 fathoms (32^{m}9 to 36^{m}6), between this reef and the point, taking care to avoid a 2-foot (0^{m}6) patch about three-quarters of a mile south-eastward of the point. Another reef, which dries, lies about 3½ miles south-eastward of the same point, and three reefs, with a least depth of 3 feet (0^{m}9) over them, lie about one mile south-westward of Tanjong Toeladenggi. The approach to Reede Toeladenggi from seaward presents no difficulty, as the few reefs near the 100-fathom (182^{m}9) line are plainly marked by discoloration; there is a prominent sandbank on the reef about 6 miles southward of Tanjong Toeladenggi.

Toeladenggi rivier flows out at Tanjong Toeladenggi and is navigable for large praus; Toeladenggi village is situated a few miles up the river. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3240.

Coast.—The coast between Tanjong Toeladenggi and Tanjong Santigi, about 15½ miles westward, is sparsely populated, and Mogogondo, 5¾ miles east-north-eastward of Tanjong Santigi, is the most important settlement. Eastward of Mogogondo the coast is tolerably flat, but westward the hills approach close to the coast, and the conical hill Santigi, situated just within Tanjong Santigi and 992 feet (302^{m}4) high, is noticeable from all directions. The summits of the mountains lying farther inland are of little use as landmarks, as they are generally obscured by haze or hidden by clouds.

The 100-fathom (182^{m}9) line lies some distance from the coast between Toeladenggi village and Tanjong Santigi (*Lat. 0° 23′ N., Long. 120° 53′ E.*), and just within is the usual barrier formation; Tongoani, a wooded islet, lies about 11 miles south-westward of Toeladenggi village, and two similar islets, Ala and Sama lie about 3 and 6 miles, respectively, west-north-westward of Tongoani. There are many reefs within the barrier, especially in the area south-eastward of Mogogondo; vessels proceeding to Toeladenggi from westward can

Charts 3240, 942a, 1263.

Chart 3240.

safely cross the barrier about one mile north-westward of Tongoani, and then steer 057° towards the roadstead.

Charts 2718, plan of Mogogondo road, 3240.

Reede Mogogondo.—Mogogondo village is situated at the head of a small inlet, and there is very good anchorage off the entrance, in a depth of about 11 fathoms (20^{m}1), with the eastern entrance point, which is covered with mangroves, bearing 000°; a steep-to bank, with some patches, which dry, on it, extends from the western shore of the creek. Sungei Sinapa flows out about one mile eastward of Mogogondo, and about 2 miles south-westward is a salt-water creek, into which a river, navigable for small praus, flows from Mosologi meer, a salt-water lake about one mile northward of Tanjong Santigi.

Vessels proceeding to Mogogondo should cross the 100-fathom (182^{m}9) line by keeping a prominent reddish hill, 101 feet (30^{m}8) high, situated on the coast about one mile south-westward of Mogogondo, in line with a hill, 433 feet (132^{m}0) high, at the head of the inlet, bearing 039°, which leads between two reefs, which dry, plainly marked by discoloration. There is no safe inshore passage between Mogogondo and Toeladenggi.

Chart 3240.

Coast.—Outlying islets and reefs.—Numerous dangers lie off the coast between Tanjong Santigi and Tomini, about 22 miles west-north-westward, and the 100-fathom (182^{m}9) line does not sharply define the outer limit of the reefs, as is generally the case throughout Golf van Tomini, several reefs having been found outside. There are no places of any importance along this part of the coast, and, pending any further information regarding a safe inner route as a result of the survey in 1931, vessels without a thorough knowledge of the locality are advised to keep well outside the 100-fathom (182^{m}9) line; at night they should keep southward of the parallel 0° 10′ N.

The reefs forming the barrier just within the 100-fathom (182^{m}9) line are plainly marked by discoloration, and the islets, which are occasionally inhabited by fishermen, make good landmarks; Oeloeë, the largest of these, lies about 5½ miles west-south-westward of Tanjong Santigi and is wooded. Saloeton lies about 10 miles west-south-westward of Oeloeë, and the 100-fathom (182^{m}9) line turns sharply northward here. Bongka lies 1¼ miles offshore and about 9 miles north-westward of Oeloeë.

The following dangers lie outside the 100-fathom (182^{m}9) line:—A small reef, which dries, lies about 6½ miles south-westward of Tanjong Santigi, and about the same distance farther south-westward is a reef, with a depth of 6 feet (1^{m}8) over it; about 1½ miles northward of the latter is a reef, which dries, marked by a white beacon, surmounted by a ball. Two reefs lie about 1¼ miles and 3½ miles eastward of Saloeton (*Lat. 0° 19′ N., Long. 120° 38′ E.*), respectively. A large reef, with several patches, which dry, on it, lies about 7 miles west-north-westward of Saloeton, and between this reef and Saloeton are four other reefs, the northernmost of which, lying just outside the 100-fathom (182^{m}9) line, has a depth of 13 feet (4^{m}0) over it. Raaf, and the reefs south-eastward of Tanjong Pelasa have been described on page 585.

Chart 2718, plan of Tomini road.

Reede Tomini.—Beacon.—Tomini consists of a number of hamlets

Chart 2718, plan of Tomini road.

situated in a plain about 4 miles wide, but, except for a few houses near the beach, most of the village is hidden by coconut plantations. A native chief, acting for the Rajah of Moöetong, resides here.

The anchorage is off the western part of the village, in a depth of about 27 fathoms (49^{m}4), with the landing pier, bearing about 022°. A reef, a small part of which dries, not marked by discoloration when covered, lies about 4 cables south-eastward of the pier, and is marked by a white beacon, surmounted by a ball; an 8-fathom (14^{m}6) patch lies about 2¾ cables westward of the beacon. The head of the pier nearly dries. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

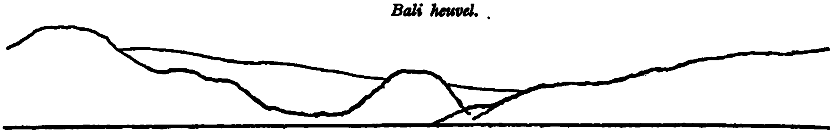
Charts 3240, 2636, 941b, 942a, 1263.

CHAPTER XVIII

NORTH-EASTERN EXTREMITY OF CELEBES, FROM THE NORTHERN ENTRANCE POINT OF GOLF VAN TOMINI TO STROOMENKAAP

Charts 940, 3240.

COAST.—The coast between Tanjong Tombalilatoe (*Lat. 0° 18′ N., Long. 123° 20′ E.*), the northern entrance point of Golf van Tomini, and Tanjong Flesko, about 72 miles eastward, is steep-to and can be approached fairly closely; there are some detached reefs off the eastern half of this coast, but except those in the vicinity of Pondang (page 600), they all lie within about three-quarters of a mile of the coast. There is mountainous land close within the coast, especially near Tanjong Dominango, about 26 miles eastward of Tanjong Tombalilatoe, and Bali heuvel, 3,124 feet ($952^{m}2$) high, 13½ miles north-eastward of Tanjong Dominango, is very prominent.



Bali heuvel, bearing 296°, distant 16 miles.

(*Original dated* 1931.)

There are several inlets, affording safe anchorage for vessels with local knowledge, along this part of the coast. Only an occasional hut is visible along the coast, as most of the villages are situated more inland; there are a few collecting places for forest produce, which are occasionally visited by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 3240.

Dangers.—Beacons.—Anchorages.—Tanjong Salongon, nearly 12 miles east-north-eastward of Tanjong Dominango, is a low point, but can be identified from a great distance eastward by the large roof of a shed for forest produce. Sungei Salongon and Sungei Malibagoe flow out in the bight immediately eastward of the point, and a 15-foot ($4^{m}6$) patch lies about half a mile eastward of the mouth of Sungei Salongon; there is good anchorage, in a depth of 13 fathoms ($23^{m}8$), inside this patch and about 2 cables offshore. Malibagoe village, where the Rajah of the district resides, lies a short distance inland.

Tolondado village is situated on the shore of a small inlet in the

Charts 942a, 1263.

Chart 3240.

eastern part of the bight between Tanjong Salongon and Tanjong Panango, about 5 miles eastward. A one-fathom (1^m8) patch lies about 3 miles westward of Tanjong Panango, and between this patch and the point are two reefs which dry; the western extremity of the northern of these two reefs is marked by a white beacon surmounted by a ball, and a black beacon, surmounted by a cone, marks the outer edge of the coastal reef about half a mile northward. An 8-foot (2^m4) patch lies about 6 cables westward of the white ball beacon. There is a safe passage leading to the small bay, on the north-eastern shore of which Panango village is situated, one mile northward of Tanjong Panango, passing westward and northward of the two reefs which dry. Anchorage may be obtained by vessels with local knowledge, in a depth of 20 fathoms (36^m6), with the black cone beacon bearing 228° and Tanjong Panango, 147°. There is a stone pier at Panango. A spit, with a depth of 11 feet (3^m4) at its outer end, extends about 6 cables southward from Tanjong Panango.

Chart 940.

Tanjong Toloe (Tolu), on which there is a round hummock, lies 10½ miles eastward of Tanjong Panango, with several reefs, some of which dry, lying about three-quarters of a mile offshore. Between Tanjong Toloe and Batoe Toloe (Batu Tolu) eilanden, about 8 miles eastward, are the three villages Mata Indoh, Tobajagan (Tobayagan) and Matandoi. Off Mata Indoh, about 2 miles east-north-eastward of Tanjong Toloe, there is anchorage, in depths of from 14 to 19 fathoms (25^m6 to 34^m7), from 2½ to 3 cables offshore. Tobajagan village stands on the north-eastern shore of a bay immediately eastward of Tanjong Binarahan, situated 4½ miles east-north-eastward of Tanjong Toloe, and Matandoi village is situated at the head of the next bay eastward; anchorage can be obtained in both these bays by eye and sounding, taking care to avoid the reefs extending about 6 cables from the point separating the two bays.

There is a deep passage, easily navigable by eye when the surrounding reefs are visible, between the two Batoe Toloe eilanden; the northern island is practically joined to the coast northward by a reef which dries.

Chart 930, plan of Jiko Bilangan and Jiko Pasilangan.

Djiko (Jiko) Pasilangan is entered about 6 cables north-eastward of Tanjong Pajoenga (Payunga), situated about 5 miles eastward of Batoe Toloe eilanden (*Lat. 0° 25′ N., Long. 124° 22′ E.*). It is deep, free from dangers, and affords anchorage at the head about 4½ cables offshore, where the depths decrease regularly, in a depth of 22 fathoms (40^m2), although it is exposed to easterly winds. Kalapa, named Babi by the natives, is an islet connected to the southern entrance point by a reef.

Djiko (Jiko) Bilangan, entered about 2 miles north-eastward of Kalapa, is also entirely clear of dangers, and is sheltered from all winds; a reef extends from the eastern entrance point, but it is plainly marked by discoloration. The best anchorage is in the north-western part, close offshore, in a depth of 20 fathoms (36^m6).

The safest approach to both these bays is between Pondang and Tanjong Flesko, taking care to avoid a 6-fathom (11^m0) patch lying nearly 1¾ miles east-south-eastward of Pondang.

Tanjong Flesko, about 4 miles north-eastward of Tanjong Pajoenga, *Chart 930, plan of Jiko Bilangan and Jiko Pasilangan.*

is high and rocky, and there is frequently a strong current and surf near the point. There is a noticeable peak (chart 940), 2,077 feet (633^{m}1) high, about 2½ miles north-westward of the point. Batu Mandi, a reef which dries, lies about 4½ cables eastward of Tanjong Flesko, with a channel clear of dangers between them.

Off-lying island.—Light.—Dangers.—Pondang, named Kalapa by the natives, is an island lying 1½ miles eastward of Tanjong Pajoenga. A reef, with a least depth of 2 fathoms (3^{m}7) over it, and on which are two rocks above water, lies within half a mile south-westward of Pondang, and a reef, with a rock above water on it, extends about 3 cables west-south-westward from the island.

A light is exhibited, at an elevation of 241 feet (73^{m}5), from a white iron framework structure, 72 feet (21^{m}9) in height, situated on the south-western slope of Pondang.

Good anchorage may be obtained, in a depth of about 44 fathoms (80^{m}5), north-westward of Pondang, off the light-keeper's dwelling, where there is a sandy beach.

Chart 940.

Coast.—The coast between Tanjong Flesko and Bentenan eilanden, about 38 miles north-eastward, is monotonously wooded and generally low; it is indented with numerous bays and there are several off-lying islets. The following mountains, some distance inland, may be identified:—Ambang, 5,981 feet (1,823^{m}0) high, 18½ miles north-north-westward of Tanjong Flesko, and Bobbelberg, 4,475 feet (1,364^{m}0) high, about 3½ miles south-eastward of Ambang; Veeltop, 5,788 feet (1,764^{m}2) high, about 6 miles east-north-eastward of Ambang; and Mata Mata, 7½ miles north-north-eastward of Veeltop. In the south monsoon the summits exceeding an elevation of about 3,000 feet (914^{m}4) are generally obscured by clouds in the daytime.

Anchorages.—Djiko Ho-oejoh (Jiko-Ho-ujoh), entered about 3½ miles northward of Tanjong Flesko, and Djiko Mataboeloe (Jiko Matabulu), a short distance farther northward, only afford anchorage close offshore for vessels with local knowledge. Laga eilandjes, two small, rocky islets, lie close off a point about 7 miles north-north-eastward of Tanjong Flesko (*Lat. 0° 28′ N., Long. 124° 31′ E.*). Westward of these islets is a bay which is deep and clear of dangers, into which Sungei Noeangan discharges; Noeangan (Nuangan) village is situated on this river, but there are only a few huts and a shed for forest produce on the coast, as the main village is situated about half a mile up the river. Anchorage can be obtained by vessels with local knowledge off the mouth of the river, in a depth of 14 fathoms (25^{m}6), about 2½ cables offshore.

Djiko Boeloentaja (Jiko Buluntaya), entered about 3 miles northward of Laga eilandjes, affords calm anchorage for vessels with local knowledge, in a depth of 14 fathoms (25^{m}6), with the landing pier, which was, in 1947, in a state of decay, bearing 262°, and a rock on the northern entrance point of the bay, 030°.

Motongkat village stands a short distance inland and about 3 miles northward of Djiko Boeloentaja; there are a couple of houses on the beach. Anchorage may be obtained here by vessels with local knowledge, in a depth of 20 fathoms (36^{m}6), about 2¾ cables offshore. Djiko (Jiko) Tehi and Djiko (Jiko) Dodap, close north-eastward of Motongkat, are collecting places for forest produce, and are occasionally

Charts 942a, 1263.

Chart 940.

visited by vessels of the Koninklijke Paketvaart Maatschappij; there are no villages in either of these two bays. Bantong is a small islet on the coastal reef, which dries, about one mile southward of Tanjong Salimboeroeng (Salimburung), a point nearly 2 miles north-eastward of Djiko Dodap. Telaga village, about three-quarters of a mile north-westward of Tanjong Salimboeroeng, is a collecting place for ebony; there is anchorage for vessels with local knowledge eastward of the village, in depths of from 20 to 23 fathoms ($36^{m}6$ to $42^{m}1$) and 2¾ cables offshore. A rock, which dries, lies nearly 1½ cables offshore about midway between Tanjong Salimboeroeng and Telaga. The large village Togid stands just within the mouth of Sungei Togid, a small river flowing out about half a mile northward of Telaga. Bambajanon (Bambayanon) is a cultivated island about 3 miles north-north-eastward of Tanjong Salimboeroeng.

Chart 930, plan of Kotabuna road.

Kotaboena (Kotabuna) is a fairly large village situated on the coast about 5 miles northward of Tanjong Salimboeroeng, and visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, whilst a brisk trade is carried out by native craft. Koemeke (Kumeke), a rocky, thickly wooded, uninhabited island, lies off the coast abreast the village, and the narrow passage between affords safe, but confined anchorage, in depths of from 11 to 16 fathoms ($20^{m}1$ to $29^{m}3$), off some coconut trees on the north-west point of Koemeke and about three-quarters of a cable from the Koemeke shore; owing to the strong tidal streams it is advisable to moor. There is a small pier, with a depth of 5 feet ($1^{m}5$) at its head, in Kotaboena village. Ratjoen (Rachun), nearly one mile eastward of Koemeke, is a low rock covered with vegetation and surrounded by a reef.

Chart 2194, plan of Totok bay.

Nearly 4 miles north-eastward of Kotaboena a narrow, hilly tongue of land extends from the coast in a north-easterly direction, and terminates in a reef with some rocky islets on it, the outer of which is named Dakokajoe (Dakokayu); this tongue of land forms the southern side of Baai van Totok, which affords spacious and sheltered anchorage in both monsoons. The high, rocky islets Hogow (*Lat. 0° 52′ N., Long. 124° 46′ E.*) and Toelang (Tulang) lie off the entrance to the bay; the bay can be entered between Hogow and Dakokajoe, or between Toelang and the coast northward, but the passage between Hogow and Toelang should not be attempted without due caution, as a bank, with depths of from 4 to 7 fathoms ($7^{m}3$ to $12^{m}8$) over it, extends nearly three-quarters of a mile south-westward from Toelang. The saddle-shaped islet Babi lies close under the northern shore of the bay, and there are two rocks above water on a reef close north-westward of it; a reef, which partly dries, lies about half a mile east-north-eastward of Babi.

Ratah Totok, a village on the western shore of the bay, is of little importance, although there are several large godowns and a loading pier, about half a cable long, belonging to the gold-mining company; from seaward the zinc roofs of the buildings where the ore is worked are noticeable on the mountain slopes about 3 miles inland. The anchorage is eastward of the loading pier, in depths of from 11 to 16 fathoms ($20^{m}1$ to $29^{m}3$); the water in the anchorage is usually discoloured brown by Sungei Totok, which flows out northward of the

Charts 942a, 1263.

Chart 2194, plan of Totok bay.

village, so that the edge of the coastal reef is not always visible. There is also anchorage in the inner bay, westward of Babi, but the space is very confined. Baai van Totok is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. Basaän village stands at the head of the bight eastward of Babi.

Chart 930, plan of Belang road.

Belang village, situated about 3½ miles north-north-eastward of the northern entrance point of Baai van Totok, can be identified from a great distance by some white houses with zinc roofs; there are good roads leading to other places in the district. Good anchorage can be obtained off the village by vessels with local knowledge, in a depth of 10 fathoms (18^{m}3), with the rest-house in line with the flagstaff, bearing about 326°, about 2 cables offshore.

Chart 940.

Bentenan eilanden.—Bentenan, the largest island of this group, lies on a reef extending from the coast about 7 miles east-north-eastward of Belang, and is saddle-shaped; close off the eastern side are four steep rocks. Two small islets or rocks lie off the southern side of Bentenan, and Poenten (Punten) lies about 1½ miles south-westward; the passage between Poenten and Bentenen, and that between Poenten and the coast should not be attempted as a strong stream sometimes runs in these passages. Pakolor, the outer islet of the group, is 217 feet (66^{m}1), high, rocky, and sparsely covered with vegetation. A rock, with a depth of 3 feet (0^{m}9) over it, lies about 2 cables southward of Pakolor, and in any swell or sea there are heavy rollers over it, whilst in calm weather its position is indicated by ripplings. The passage between Pakolor and Bentenan is clear, but the sea is confused when the wind is against the stream.

Good anchorage can be obtained by vessels with local knowledge about half a mile south-eastward of Bentenan village, situated about 1¾ miles northward of Bentenan. *See* view facing page 612.

Coast.—Between Bentenan eilanden and Kema, about 25 miles north-north-eastward, the coast is low and monotonously wooded, with no distinctive features; there are no outlying dangers, and the 20-fathom (36^{m}6) line lies fairly close to the coast. Tanjong Ipoes (Ipus), Tanjong Atep, and Tanjong Mangket (*Lat. 1° 18′ N., Long. 125° 04′ E.*) are all low, and are only noticeable from south-westward or north-eastward.

North-westward of Bentenan eilanden is a low plain, from 6 to 7 miles wide, extending to the foot of the active volcanoes Manimporok, Sopoetan (Soputan), Sempo and Kawatak. Kaweng, about 11 miles northward of Bentenan eilanden, has a rounded summit, and thence a thickly-wooded ridge, from which numerous spurs extend to the coast, runs for about 20 miles north-north-eastward to Kalabat, a very prominent cone-shaped mountain, 6,634 feet (2,022^{m}1) high, visible all round and projecting high above the adjacent mountains.

Chart 930, plan of Kema road.

Reede Kema.—Light.—Kema village is situated on a plain at the foot of Kalabat, and the numerous coconut trees along the beach indicate its position; the village is not easily seen from seaward, especially when approaching from southward, as the houses are then hidden by some high rocks southward of the roadstead. The most prominent marks are the white light-structure, the mosque, the rocky

Charts 2575, 943, 942a, 1263.

Chart 930, plan of Kema road.

point southward of the village, and Batu Nonna, a rock on the drying coastal reef extending from this point.

The roadstead affords good anchorage, in depths of from 5 to 11 fathoms ($9^{m}1$ to $20^{m}1$), throughout the year; a vessel anchoring in a depth of 6 fathoms ($11^{m}0$) will lie about 2¾ cables offshore. Landing can always be obtained on the southern side of the roadstead, even when this is impracticable elsewhere owing to the heavy swell; under favourable conditions the most convenient landing place is by the light-structure.

A shoal, with a depth of 5½ fathoms ($10^{m}1$) over it, lies about 4½ cables east-north-eastward of Batu Nonna; on the northern side of the roadstead, and just outside the 10-fathom ($18^{m}3$) line, is a reef with a depth of 3 fathoms ($5^{m}5$) over it, lying about 1½ miles north-eastward of Batu Nonna.

A light is exhibited, at an elevation of 27 feet ($8^{m}2$), from a white wooden post, 29 feet ($8^{m}8$) in height, on the beach at Kema.

Chart 940.

Lembeh.—Lembeh is an uninhabited, thickly wooded island, 1,545 feet ($470^{m}9$) high, lying with its south-western end about 6 miles east-north-eastward of Kema. The southern extremity of the island is formed by a narrow, hilly tongue of land; a small sandbank lies on a reef about 7 cables westward of this point, and a 2-fathom ($3^{m}7$) patch lies about 3 cables northward of the sandbank. The south coast of Lembeh is fringed by a fairly extensive coral reef, which dries, and there are several small inlets; Pulau Doea (Dua), with two small peaks, 310 feet ($94^{m}5$) high, lies midway along this coast, and the rocky islet Soesoelina (Susulina) lies close off the south-eastern point.

The east coast of Lembeh is rocky and steep-to, and can be approached closely; some detached rocks, on which there is generally surf, lie close under this coast. The northern extremity of the island consists of large masses of red and black rocks covered with vegetation. Outside this point are numerous rocks, against which the sea breaks heavily; Batu Kapal, the largest of these, is 85 feet ($25^{m}9$) high, and white from guano, and rocks extend for a further distance of 2 cables northward of it, the outermost being about 6 feet ($1^{m}8$) high. The north-east point of the island is a wedge-shaped rock, about 200 feet ($61^{m}0$) high; this point and Batu Kapal (*Lat. 1° 33′ N., Long. 125° 18′ E.*) may be rounded at a distance of about half a mile, but there is usually a strong tide race with whirlpools.

Charts 2194, plan of the Narrows, Lembeh strait, and 940.

Straat Lembeh.—Light.—Dangers.—Straat Lembeh, separating Lembeh from the mainland, is narrow and somewhat intricate; in the middle are some islets fringed by reefs, with a channel on either side, but the north-western passage is the better, as it is nearly straight and the reefs are generally plainly visible. Vessels using this passage should pass eastward of a 4¼-fathom ($7^{m}8$) patch lying 4¼ cables west-south-westward of the south-westernmost islet; a 2½-fathom ($4^{m}6$) patch, not always marked by discoloration, lies off the north-eastern entrance to the passage and nearly in the middle of the strait; vessels should pass south-eastward of it.

Two shoals, with depths of about 5 feet ($1^{m}5$) over them, lie nearly half a mile offshore southward of Tanjong Merah, the south-western entrance point of the strait, so vessels should give this part of the

Charts 2575, 943, 942a, 1263.

Charts 2194, plan of the Narrows, Lembeh strait, and 940.

coast a good berth when proceeding to and from Kema. Girian village is situated on the Celebes shore, nearly 2 miles north-north-eastward of Tanjong Merah, and a steep-to bank of sand and mud extends about 3 cables from the village.

A pier, about 130 feet (39^{m}6) long, with a depth of 6 feet (1^{m}8) alongside, is situated at Aer Tembaga on the northern side of the strait, about 6 cables westward of the south-westernmost islet. A light is exhibited on the head of the pier. A reef, which dries, lies close southward of the pier-head.

The tidal streams in Straat Lembeh are semi-diurnal, and in the narrowest parts attain a rate of from 3 to 4 knots; the stream sets northward at about high water, and southward at about low water. Southward of the islets there is little stream under the Lembeh shore, and sometimes there is an eddy.

Anchorage can be obtained off the western side of the northern entrance of the strait, in a depth of 20 fathoms (36^{m}6), with Batu Kapal bearing 056°, and about 2 cables northward of two pillar rocks, about 40 feet (12^{m}2) high, lying under the Celebes shore.

There is also anchorage in Reede Bitoeng off the Celebes shore about 4½ miles east-north-eastward of Girian village; the roadstead is bounded by the parallels of 1° 27′ 05″ N. and 1° 26′ 35″ N., by the meridian of 125° 13′ 00″ E. and, westward, by the coastline of Celebes.

Chart 940.

Coast.—The coast between the northern entrance of Straat Lembeh and Tanjong Poeisan (Puisan), about 12 miles north-north-westward, is steep-to, and there is a heavy surf with a northerly or north-easterly swell. Batoe Angoes (Batu Angus) is a volcano westward of the northern entrance of Straat Lembeh, and on its south-eastern slope is another crater, named Batoe Angoes Baroe (Batu Angus Baru), in the shape of a truncated cone and not so thickly wooded as the adjacent mountains; Soedara (Sudara), about 2¼ miles south-westward of Batoe Angoes, has a double peak.

Mogogimboen (Mogogimbun), about 5 miles southward of Tanjong Poeisan and about three-quarters of a mile from the coast, is a conical, rocky islet, 163 feet (49^{m}7) high, covered with vegetation; a reef, with two rocks above water on it, extends from the northern side of the islet, and breaks heavily with the slightest sea or swell. Anchorage can be obtained in the bay westward of Mogogimboen, sheltered from southerly winds, in a depth of 20 fathoms (36^{m}6), with Mogogimboen bearing 093°, and Batu Pandita, 022°. Kalinaon, about 2 miles northward of Mogogimboen, is a small islet, 250 feet (76^{m}2) high, covered with vegetation and joined to the coast by a reef.

Tanjong Poeisan (*Lat. 1° 41′ N., Long. 125° 10′ E.*) is a bold headland rising to a flat tableland shaped like a coffin; Batu Pandita, close southward of the point, is a rock, 30 feet (9^{m}1) high, with a white conical top.

STRAAT BANGKA.—Light.—Straat Bangka (Banka) is bounded on the south by the north-east coast of Celebes between Tanjong Poeisan and Noordkap (North cape), about 12 miles west-north-westward, and on the north by a group of islands, of which Bangka (Banka), Talisei and Gangga (Ganga) are the principal. The depths throughout the strait are very irregular, but the water is so clear

Charts 2575, 943, 942a, 1263.

Chart 940.

that the bottom can be seen in depths of from 8 to 10 fathoms ($14^{m}6$ to $18^{m}3$) in a calm sea. The strait is available for vessels of any draught by following the directions given on page 607.

About 3½ miles westward of Tanjong Poeisan is a rocky point, 295 feet ($89^{m}9$) high, which may be identified by a prominent black rock, 18 feet ($5^{m}5$) high, in the form of a pyramid, connected to it. The southern shore of the strait thence to Noordkap is described with Reede Likoepang on page 606. Noordkap or Tanjong Torawitan is wedge-shaped when seen from eastward or westward and rises gradually to the hilly land within.

Bangka, the easternmost of the islands forming the northern side of Straat Bangka, is hilly and densely wooded, the highest part being on the eastern side. Tanjong Sahaong, the southern extremity of the island, is cliffy. Pulau Sahaong, and several rocks above water, lie on a reef extending southward from a long tongue of land about one mile north-eastward of Tanjong Sahaong, which forms the southern side of Djiko (Jiko) Sago. Tanjong Batoe (Batu) Gosoh, the eastern extremity of Bangka, rises to a sharp conical hill, 266 feet ($81^{m}1$) high; some needle rocks, from 15 to 20 feet ($4^{m}6$ to $6^{m}1$) high, lie off this point, and there are also some rocks above water off Tanjong Toto, about 1½ miles southward. The northern extremity of Bangka is low, and a coral reef extends about 2 cables north-westward, with Batu Kapal, a rock 14 feet ($4^{m}3$) high, on the extremity; the tidal streams are sometimes very strong along this point.

Kinabahoetan, about 2¼ miles west-south-westward of the northern extremity of Bangka, is described with Reede Talisei on page 606.

Talisei is separated from Kinabahoetan by a narrow channel only available for small craft. This island is thickly wooded, and a ridge runs almost throughout its length, with the highest peak in about the middle; the southern end of the island is low. Tanjong Aroes (Arus), the northern extremity of Talisei, is a bold cliff with large rocks at the base. Along the western side of the island the coastal reef dries out to about one cable, widening out to about a quarter of a mile off the south-western extremity.

A light is exhibited, at an elevation of 352 feet ($107^{m}3$), from a white iron framework structure, 65 feet ($19^{m}8$) high, on Tanjong Aroes.

Tindila is separated from the southern extremity of Talisei by a clear and deep channel about 4 cables wide. The northern part of this island is rocky, and the southern part terminates in a white sandy beach; a reef extends about 4 cables south-westward from the western side of the island.

Gangga is separated from Tindila by a narrow channel only fit for boats. There is a hill, 295 feet ($89^{m}9$) high, on the southern end of the island. The east coast is steep-to, but the west coast is fringed by a reef. Lehaga (*Lat. 1° 46′ N., Long. 125° 02′ E.*) lies about three-quarters of a mile westward of the southern extremity of Gangga, and is about 100 feet ($30^{m}5$) high.

Tidal streams.—The tidal streams in Straat Bangka are semi-diurnal, and attain a rate of from 2 to 3 knots at spring tides. The west-going stream, striking against Tanjong Bohoi, a low rounded point, on the southern side of the western entrance, about 3 miles south-eastward of Noordkap, is partly deflected northward, one part running between Gangga and Lehaga; owing to the danger of being

Charts 2575, 943, 942a, 1263.

Chart 940.

set on to either side of the strait here, a more or less mid-channel course is advisable. The east-going stream is coupled with a south-easterly set from the islands on the northern side of the strait, principally along the western side of Bangka.

With an east-going stream in Straat Bangka the water sets in strongly between the northern extremities of Talisei and Bangka. With a west-going stream in Straat Bangka the tidal stream sets north-westward and northward between Talisei and Bangka, as well as along the west coasts of Gangga, Tindila, and Talisei; these last two streams unite about 3 miles north-westward of Tanjong Aroes, causing heavy tide-rips and eddies.

Local weather.—In July, August, and September the general direction of the wind in Straat Bangka was between south-south-east and south; force 2 to 3 (Beaufort scale) during the day, and light airs and calms at night. A few showers occurred, but there were no really wet days. There was one blow from the southward, force 4 to 6, which lasted 48 hours, and on many days a squall out of Straat Lembeh. The weather was never very clear, except in the early morning, and the tops of the mountains were generally obscured by clouds. In the latter part of August, and in September, the atmosphere became thicker, and during the latter part of September the land was seldom seen at a distance of more than a few miles. The average temperature was 82°.

Chart 930, plan of Likupang road.

Reede Likoepang.—Dangers.—Likoepang (Likupang) village is situated on the western side of the mouth of a rivulet about 3½ miles westward of the prominent black pyramidal rock (page 605). The two points situated about 1½ and 2½ miles westward of this rock are wooded to the water's edge. Tamperong is a low island about 2 miles west-north-westward of Likoepang village.

There are numerous reefs in Reede Likoepang (Likupang) and they are usually marked by discoloration; those with depths of less than 5 fathoms ($9^{m}1$) over them, lie southward of the line joining Tanjong Poeisan and Noordkap, except a 4-fathom ($7^{m}3$) patch about 4¼ miles westward of Tanjong Sahaong. Korrier rif, 2¾ miles north-eastward of Likoepang, has a depth of 3 fathoms ($5^{m}5$) over it, and is usually marked by tide-rips; a bank, with depths of from 3½ to 5 fathoms ($6^{m}4$ to $9^{m}1$) over it, extends about 7 cables southward from this reef, and a 5¼-fathom ($9^{m}6$) patch lies half a mile northward of it. A 3-fathom ($5^{m}5$) patch lies about 2¼ miles westward of Korrier rif; these are the outermost dangers on the southern side of Straat Bangka.

Reede Likoepang is well sheltered in the south monsoon. There is good anchorage, in depths of from 7 to 9 fathoms ($12^{m}8$ to $16^{m}5$), with the middle of the village bearing 200°, and Tanjong Bohoi, 314°; small vessels can anchor closer in, but care should be taken that the pyramid rock off the point, about 3½ miles westward of Tanjong Poeisan (*Lat. 1° 41′ N., Long. 125° 10′ E.*), is not shut in by the first point eastward of Likoepang, as the ground inside is very foul. Vessels approaching the roadstead should take care to avoid Korrier rif and a 4-fathom ($7^{m}3$) patch lying about 1½ miles westward.

Chart 930, plan of Talisei road.

Reede Talisei.—Light.—Dangers.—Reede Talisei is situated off the south-eastern side of Talisei. Kinabahoetan (Kinabahutan), about

Chart 930, plan of Talisei road.
1½ miles westward of the northern end of Bangka, is a low, wooded island, with a hill about 60 feet ($18^{m}3$) high on its south-eastern side. There are depths of over 5 fathoms ($9^{m}1$) in the channel between Kinabahoetan and Bangka.

A light is exhibited, at an elevation of 17 feet ($5^{m}2$), from a wooden post, on the head of the mole.

The roadstead affords good anchorage, in a depth of about 10 fathoms ($18^{m}3$), off the buildings of the Molucca Trading Company, on the prolongation of the mole, and the western extremity of Kinabahoetan, bearing 047°; this berth lies between the head of the mole and a 4½-fathom ($8^{m}2$) patch about 3 cables south-eastward. Small vessels can anchor between the head of the mole and a 3-foot ($0^{m}9$) patch about one cable south-eastward, with a sternfast to the mole; an 11-foot ($3^{m}4$) patch lies about 60 yards ($54^{m}8$) south-south-westward of the 3-foot ($0^{m}9$) patch, close northward of which is a black can buoy. Small craft can lie alongside the mole at any state of the tide.

A detached reef, with a depth of 5 feet ($1^{m}5$) over it, lies on the northern side of the roadstead about 6 cables eastward of the head of the mole.

There is a Government coal depôt at Talisei. The roadstead is visited occasionally by vessels of the Koninklijke Paketvaart Maatschappij.

Directions for Straat Bangka.—Vessels of deep draught should steer through Straat Bangka with the southern extremity of Nain, an island 11½ miles westward of Noordkap, in line with that cape, bearing 277°; this alignment leads close southward of Tanjong Sahaong and a 29-foot ($8^{m}8$) patch about 2¾ miles westward, and close northward of two shoals, with depths of 30 and 33 feet ($9^{m}1$ and $10^{m}1$) over them, situated about 2½ and 4 miles, respectively, westward of the same point. By keeping northward of the line joining Tanjong Poeisan and Noordkap a vessel will obtain depths of not less than 4 fathoms ($7^{m}3$) in the strait.

Charts 940, 942a.

NORTH COAST OF CELEBES.—The north coast of Celebes between Noordkap and Stroomenkaap, about 255 miles westward, is generally high, and most of the salient points are formed by spurs from the high mountains, which lie a short distance within the more or less hilly coast; there is often a white sandy beach between the points. The coast is generally steep-to and can be approached closely, although numerous reefs lie within the 100-fathom ($182^{m}9$) line off the middle part; as these reefs are nearly always marked by discoloration, and there are sufficient prominent points for fixing the vessel's position, they are easily avoided. Except off Tanjong Soemalata, about 100 miles eastward of Stroomenkaap, there are no dangers outside the 100-fathom ($182^{m}9$) line.

Tidal streams.—Little is known of the tidal streams under the north coast of Celebes, as no systematic observations have been made. From numerous reports received tidal streams along this coast appear to be irregular and fairly strong, especially between Menado and Stroomenkaap (*Lat. 1° 20′ N., Long. 120° 49′ E.*); in the month of June, during the first quarter of the moon, a tidal stream with a rate of from 2½ to 3 knots was observed, setting on to the coast in an east-south-east direction.

Charts 2575, 943, 1263.

Charts 940, 942a.

Winds.—In the north-eastern part of Celebes the South-east monsoon is known by the name "Selatan," meaning south wind. Unusually strong west winds during the season of the North-west monsoon are known as "Barat."

Chart 940.

Coast.—Anchorages.—The coast between Noordkap and Tanjong Pisok, 15½ miles south-westward, is low, and the 100-fathom ($182^{m}9$) line lies close offshore; it is fringed by a generally narrow reef, except in the bight immediately south-westward of Kora Kora baai, which bight is almost entirely filled by it. Toempa (Tumpa), 2,142 feet ($652^{m}9$) high, lies about 2½ miles eastward of Tanjong Pisok.

Chart 2194, plan of Kora Kora bay.

Kora Kora baai, about one mile south-westward of Noordkap, affords well-sheltered anchorage, in a depth of about 19 fathoms ($34^{m}7$); a reef, which dries, extends from both entrance points, leaving a passage about half a cable wide between.

Chart 940.

Kima village is situated about 11 miles south-westward of Noordkap, at the head of Baai van Wori. Three reefs, with a depth of 1¾ fathoms ($3^{m}2$) over the north-easternmost and shoalest, lie off the entrance to the bay, and are only slightly marked by discoloration. Vessels with local knowledge can anchor off Kima village, in a depth of about 16 fathoms ($29^{m}3$), with a landfast to the shore, sheltered from north-westerly winds by the reefs, and landing can be effected here when this is impracticable at Menado; there is also anchorage inside the reefs, in a depth of about 23 fathoms ($42^{m}1$). Wori village stands on the southern shore of the bay.

Off-lying islands.—Nain, 630 feet ($192^{m}0$) high, appears saddle-shaped from eastward or westward; it is fringed by a wide coral reef, on the eastern side of which is Nain kechil, 115 feet ($35^{m}0$) high. Manterawoe (Manterawu), about 2¼ miles south-westward of Nain, is flat and wooded; the reef which fringes it extends about 1¼ miles from its northern side. Menado Toea (Tua), about 4 miles south-south-westward of Manterawoe, is a steep island, 2,697 feet ($822^{m}1$) high, and in the form of a truncated cone, having the appearance of a volcano. Boenakeng (Bunakeng), about 1¼ miles eastward of Menado Toea, is low except for a hill, 361 feet ($110^{m}0$) high, in the western part. Siladeng, about 1½ miles off the north-eastern side of Boenakeng, is low.

All the above islands are planted with coconut trees. There are deep and clear passages between them.

Baai van Menado.—Baai van Menado, entered between Tanjong Pisok (*Lat. 1° 34′ N., Long. 124° 48′ E.*) and Tanjong Kalasei, about 8 miles south-south-westward, has considerable depths except close offshore. The coastal reef extends about 4 cables from Tanjong Pisok and is steep-to; this reef continues as a narrower fringe along the whole shore of the bay.

Menado rivier, which has its origin in Meer van Tondano, 2,460 feet ($749^{m}8$) above sea level, flows out on the eastern side of the bay. The river is only navigable for small craft over a short distance and is dangerous to enter under unfavourable conditions.

Chart 2194, plan of Menado road.

Reede Menado.—Lights.—Beacons.—Menado, the capital of the

Charts 2575, 943, 1263.

Chart 2194, plan of Menado road.

Minahasa district and the seat of the Residency, is situated at the mouth of Menado rivier. The European part, containing the New Amsterdam fort, an old stone building surrounded by a moat, is situated on the southern side of the river; the native quarters are mostly on the northern side. In 1936 the population of Menado was about 40,000. There is a basin for praus, with a depth of 3 feet (0^{m}9) on the southern side of the entrance to Menado rivier, but in 1946, it was reported to be silted up. A mole, from the head of which a light is exhibited, extends from each side of the entrance to the river. The landing place for boats is at the inner end of the basin, where there is a depth of 2 feet (0^{m}6).

The roadstead is never calm, and during December, January, and February, when heavy squalls named "Barat" blow from north-westward, it is often unsafe; during these months high seas and swell prevent communication with the shore, and, unless the vessel is secured to a mooring buoy, steam should be kept up. During the remaining months of the year it is squally, especially in the evenings after the land wind has set in, and during the "Selatan," or southerly monsoon, although communication with the shore is not interrupted. September and October are the best months. It is extremely rare for the wind to occur without the warning sign of black clouds which envelop Menado Toea, usually about half-an-hour before the wind starts to blow. Two or three hours' warning may be expected if the force of the wind is going to be very severe. The wind is more northerly at Menado and Tondano in January and February than in November and December. When conditions are unfavourable at Menado vessels can anchor off Kima village, in Baai van Wori, whence goods can be conveyed to Menado.

When communication with the shore is broken off, a blue flag will be displayed by day; at night a *red* light will be exhibited under the light at the head of the southern mole.

The climate at Menado is very healthy, and infectious diseases are seldom known; the nights are cool. The annual rainfall averages 104 inches; 12 inches or more fall in each month from December to March inclusive, but only between 3 and 4 inches in August and September. The average temperature for the year is 80°; the difference between the average temperature of the hottest and coolest months is only 2°. The temperature has been known to rise to 96° in September and to fall to 64° in July.

A light is exhibited, at an elevation of 39 feet (11^{m}9), from a white iron framework structure, 39 feet (11^{m}9) in height, situated on the beach about 3¾ cables southward of the head of the southern mole.

A white beacon, surmounted by a ball, stands on the reef lying about 2 cables west-north-westward of Tanjong Tokabene, situated about 4½ cables south-south-westward of the light-structure on the beach.

Chart 940.

A beacon, surmounted by a triangle painted in red and white horizontal bands, stands against a coconut tree about 3 cables southward of Tanjong Tokabene (*Lat. 1° 29′ N., Long. 124° 50′ E.*).

Chart 2194, plan of Menado road.

Anchorage.—Directions.—Anchorage may be obtained, in a depth of about 30 fathoms (54^{m}9), about 4 cables offshore. Owing to lost cables, vessels should avoid anchoring on the foul ground, *Chart 2194, plan of Menado road.*

indicated on the chart by pecked lines, about 3½ cables north-westward of the main light-structure.

The roadstead is bounded by lines drawn in a 281° direction from the light-structure, and from the beacon marking the northern limit of the roadstead; and by a line joining positions, on those lines, situated 600 metres (about 3¼ cables) from the shore.

The anchorage should be approached with about 45 fathoms (82^m3) of cable out, and the vessel should steer direct for Menado, the zinc roofs of which will first be seen. Anchoring southward of Tanjong Tokabene is inadvisable unless the vessel moors.

There are several mooring buoys in the roadstead.

Harbour facilities.—Fresh provisions are obtainable. Water can be delivered from a 19-ton tank from a tug or a 50-ton water prau.

Menado is the headquarters of a Government official. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. The town is connected to the general telegraph and district telephone systems. There is a harbour doctor, and a hospital.

Radio station.—There is a radio station at Menado. *See* page 10.

Chart 940.

Coast.—The coast between Tanjong Kalasei and Tanjong Pasir Poetih (Putih), 16½ miles south-westward, is hilly; Lokon, about 5 miles southward of Tanjong Kalasei, has four summits, and about 5½ miles north-eastward of Tanjong Pasir Poetih, is a sharp summit, 2,303 feet (701^m9) high.

Between Tanjong Kalasei and Tanjong Kelapa, 8 miles west-south-westward, there is only a narrow coastal reef, except by Tanjong Mokoepa (Mokupa), where it projects about half a mile; there are a few unimportant villages along this part of the coast. Between Tanjong Kelapa and Tanjong Pasir Poetih the coast is fringed by a reef, which dries, extending in places nearly 2 miles offshore, with several detached reefs outside, all steep-to; there are no dangers outside the 100-fathom (182^m9) line, and this part of the coast should be given a berth of 3 miles. Tetapaän, a low, thickly wooded island, lies on the coastal reef close south-westward of Tanjong Pasir Poetih. There are several deep inlets in the coastal reef between Tanjong Kelapa and Tanjong Pasir Poetih, and Arakan village stands at the head of one of them about midway between these two points.

Baai van Amoerang.—Amoerang (Amurang) baai is entered between Tetapaän and Tanjong Walentau, about 8½ miles south-westward, and presents an inviting aspect of wooded and cultivated hills, with mountains in the background. On the eastern side of Tetapaän there is an inlet in the coastal reef, where small vessels can find sheltered anchorage with the " Barat "; there is also another small inlet, named Pelaboehan Loeak (Pelabuhan Luak), on the northern side of the bay, available for small vessels with local knowledge, taking care to avoid the reefs off the entrance.

A round-topped tree near Bitoeng (Bitung) village, situated in the south-eastern part of Baai van Amoerang, in line with a hill some distance inland, bearing 138°, leads clear of the reef extending from Tetapaän (*Lat. 1° 18′ N., Long. 124° 30′ E.*), but this alignment is not easily identified unless acquainted with the locality; Tanjong Mobongo, about 2¼ miles west-north-westward of Bitoeng, can be seen from a considerable distance outside the bay.

Charts 2575, 943, 942a, 1263.

Charts 2194, plan of Amurang road, 940.

Reede Amoerang.—Light.—Amoerang (Amurang) village, the headquarters of a Government official, is situated in the south-eastern corner of Baai van Amoerang, between the mouths of Sungei Rano Rapo and Sungei Rano Wangko. Near the shore are the remains of the old lunette, with a flagstaff; the Government official's house is situated close eastward of Sungei Rano Wangko, but the flagstaff is not visible from seaward. A bridge over Sungei Rano Rapo connects Amoerang with Romoon village.

A light is exhibited from a mast, 20 feet ($6^{m}1$) in height, about three-quarters of a cable northward of the flagstaff.

The roadstead lies off Amoerang village southward of a line joining Tanjong Sangket, which lies about half a mile north-westward of Tanjong Mobongo, and the mouth of Sungei Pentoe, 4 miles east-north-eastward; it is safe throughout the year, but the bottom is very steep. The best anchorage is in a depth of 38 fathoms ($69^{m}5$), sand, with the flagstaff on the ruins of the old lunette just visible above a Custom house in front, bearing 146°; vessels should approach the shore with about 40 fathoms ($73^{m}2$) of cable out, veering to about 90 fathoms ($164^{m}6$) as soon as the anchor holds, and then securing with a landfast. Westward of this position the bottom consists of mud and coral, and is unsuitable for anchoring.

There is also anchorage off the coffee warehouse about half a mile north-westward of the mouth of Sungei Rano Rapo, but during the "Selatan" season a stern anchor should be laid out southward.

Amoerang is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. There is a good road to Tondano, passing through Toempaän (Tumpaän), a village in the north-eastern part of Baai van Amoerang.

Chart 940.

Coast.—The coast between Tanjong Walentau and Tanjong Nonapang, about 15 miles south-westward, is hilly, except near the latter point, where Sungei Poigar flows through a low plain. Tanjong Bojong (Boyong), about 6½ miles south-westward of Tanjong Walentau, has an isolated, round hillock, 98 feet ($29^{m}9$) high, on it, and about 2½ miles eastward of this point is a summit, 2,054 feet ($626^{m}1$) high; Lolomboelan (Lolombulan), a mountain about 6 miles east-south-eastward of Tanjong Bojong, and Sinong Sajan (Sayan), about 4½ miles southward of Tanjong Bojong, are also prominent. There are no dangers along this part of the coast, and anchorage can be obtained off Poigar village, about 4 miles north-eastward of Tanjong Nonapang, in depths of from 35 to 40 fathoms ($64^{m}0$ to $73^{m}2$), about 2 cables offshore; vessels should not proceed farther in owing to the heavy rolling which is caused by the slightest westerly winds.

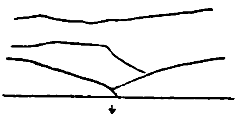
Between Tanjong Nonapang and Bolaäng Mongondou, about 6 miles south-westward, the 100-fathom ($182^{m}9$) line lies some distance from the coast, and there are several reefs within. Mariri, a rounded mountain, 1,539 feet ($469^{m}1$) high, lies about 3½ miles south-westward of Tanjong Nonapang (*Lat. 1° 00′ N., Long. 124° 14′ E.*).

Chart 2194, plan of Bolaang Mongondau.

Reede Bolaäng Mongondou.—There is anchorage off Bolaäng Mongondou village, in depths of from about 16 to 19 fathoms ($29^{m}3$ to $34^{m}7$), about 3 cables offshore, although westerly winds quickly raise a heavy sea along this part of the coast, and communication

Chart 2194, plan of Bolaang Mongondau.

with the shore is then impracticable. Vessels making for the roadstead from north-eastward should keep outside all the reefs lying within the 100-fathom (182$^{\text{m}}$9) line between Tanjong Nonapang and Bolaäng Mongondou unless acquainted with the locality. The foot of Banka (*Lat. 0° 55′ N., Long. 124° 05′ E.*) and Ompoe (Ompu), two hills, in line with the north-western side of Bokki (chart 3195), a mountain, 1,978 feet (602$^{\text{m}}$9) high, bearing 235°, leads through these reefs, but good visibility is necessary, and the alignment leads very close north-westward of the reefs extending from Tanjong Nonapang; Banka and Ompoe lie near the coast about 4¼ and 7 miles, respectively, west-south-westward of Bolaäng Mongondou, and Bokki lies about 8½ miles south-westward of Ompoe. The bank off the mouth of the river close north-eastward of the village is gradually working out and partly dries.



North-western side of Bokki above foot of Banka and Ompoe, bearing 235°.

(Original dated 1934.

The roadstead is bounded by the arc of a circle, drawn with a radius of 850 metres (about 4½ cables) from a position in lat. 0° 57′ 03″ N., long. 124° 09′ 22″ E.

Chart 940.

Reede van Inobonto.—Dangers.—Inobonto village stands at the foot of Banka and close southward of Tanjong Inobonto, which is formed by a spur from this hill; there are extensive coconut plantations immediately eastward of Inobonto, and also near Bolaäng Mongondou. There is anchorage, in a depth of about 30 fathoms (54$^{\text{m}}$9), with the flagstaff in the middle of the settlement in line with a customs shed, situated farther inland, bearing about 213°. A 2¾-fathom (5$^{\text{m}}$0) patch lies about 4 cables offshore and about 1½ miles east-north-eastward of Banka, and a reef, which dries, lies about 6 cables farther east-north-eastward. This roadstead, and also that of Bolaäng Mongondou, are visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. *See* view facing this page.

Chart 3195.

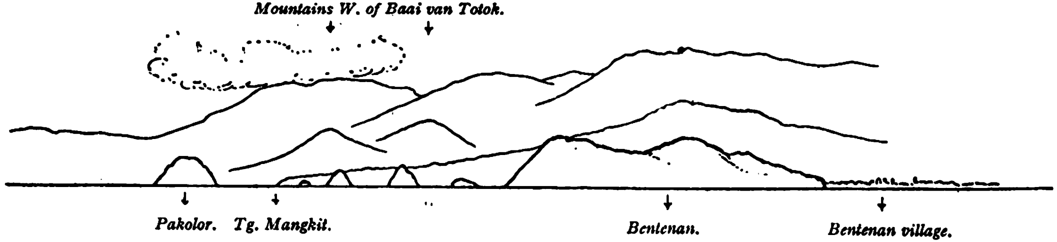
Coast.—Islet and dangers.—The coast between Banka and Tanjong Bilang, about 10 miles west-south-westward, is generally low, except near Ompoe; a short distance within the land rises in various ranges to Antara gebergte, lying about 8 miles inland. The 100-fathom (182$^{\text{m}}$9) line lies 3 or 4 miles from the coast, and within the bottom shelves gradually, although the depths are somewhat irregular.

A reef, with a depth of 1¼ fathoms (2$^{\text{m}}$3) over it, lies about 2½ miles northward of Ompoe, and about 4½ miles north-westward of the same hill is a 6-fathom (11$^{\text{m}}$0) patch, lying close within the 100-fathom (182$^{\text{m}}$9) line. Molosso, about 4½ miles westward of Ompoe, is a hilly islet; a 6-fathom (11$^{\text{m}}$0) patch lies about 2 miles north-north-westward of Molosso, and about midway between this islet and Tanjong Bilang and 6 cables offshore is a 1¼-fathom (2$^{\text{m}}$3) patch.

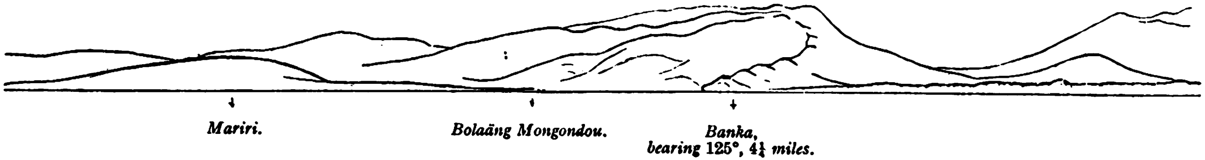
Chart 2194, plan of Bolaang Uki bay.

Baai van Bolaäng Oeki.—Dangers.—Baai van Bolaäng Oeki (Uki), entered between Tanjong Bilang (*Lat. 0° 52′ N., Long. 123° 56′ E.*) and Tanjong Nanasi, about one mile west-south-westward, affords good and well-sheltered anchorage under all conditions. The high islet Tikoes (Tikus) lies on the eastern side of the entrance, and a

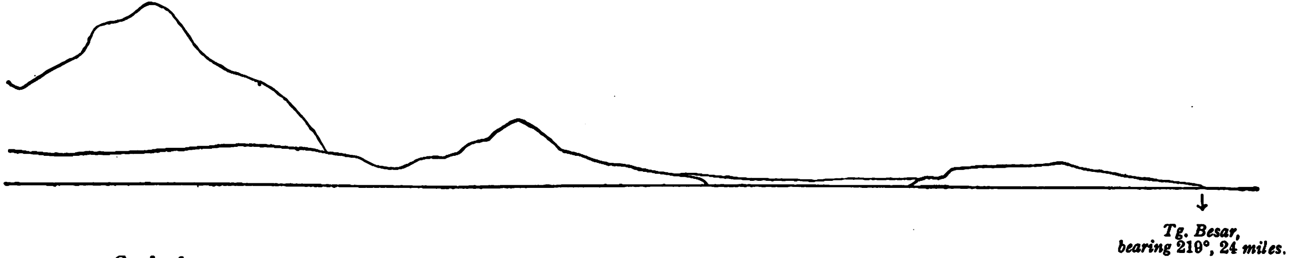
Charts 2575, 943, 942a, 1263.


Mountains W. of Baai van Totok.
Pakolor.
Tg. Mangkit.
Bentenan.
Bentenan village.

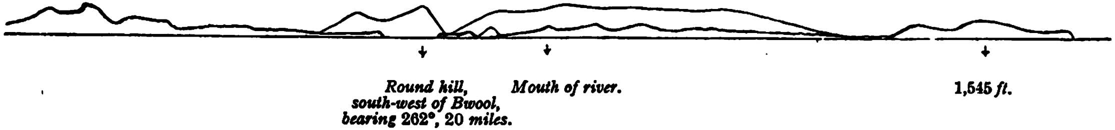
Celebes, north-eastern extremity. East point of Bentenan, bearing 249°.
(*Original dated* 1931.)


Mariri.
Bolaäng Mongondou.
Banka,
bearing 125°, 4½ miles.

Celebes, north coast. Bolaäng Mongondou and vicinity.
(*Original dated* 1931.)



Celebes, north coast. North-eastern approach to Kwandang baai.
(*Original dated* 1931.)


Round hill,
south-west of Bwool,
bearing 262°, 20 miles.
Mouth of river.
1,545 ft.

Celebes, north coast. Eastern approach to Bwool.
(*Original dated* 1931.)

Chart 2194, plan of Bolaang Uki bay.

steep-to reef, which partly dries, extends 2 cables from its southern side. A rock, which dries, lies off the northern side of the bay about 4¼ cables east-south-eastward of Tikoes, and a 5½-fathom (10^{m}1) patch lies about the same distance south-south-westward of the islet. A reef, which dries, lies about 2 cables north-north-eastward of Tanjong Lingkot, situated on the southern shore of the bay about 1¼ miles south-eastward of Tanjong Nanasi; a rock, which dries, lies about 2 cables north-westward of Tanjong Lingkot. Except for these dangers there are regular depths of from 10 to 16 fathoms (18^{m}3 to 29^{m}3) almost throughout the entire bay.

Chart 2194, plan of Domisil bay.

Baai van Domisil.—Danger.—Immediately westward of Tanjong Toengkoep (Tungkup), situated 7¼ miles westward of Tanjong Nanasi, is a wide bay, divided into two parts by a peninsula named Loboka; the part westward of Loboka, named Baai van Domisil, affords sheltered anchorage in the inner part from all winds except between north-north-west and north. The shore of the bay is fringed by a reef, which dries, and a detached reef, which dries, lies about 2½ cables off the eastern shore.

Chart 3195.

Coast.—Off-lying islets and dangers.—The coast between Baai van Domisil and Tanjong Besar, 48 miles westward, is generally high, with mountains rising a short distance within. The 100-fathom (182^{m}9) line lies some distance from the coast, and, between Tanjong Bokabak, about 17 miles westward of Baai van Domisil, and Tanjong Besar there are numerous reefs within that depth.

Pulau Tiga, consisting of three wooded islets, lie northward of the high tongue of land which terminates in Tanjong Toengkoep. Toendonia (Tundonia), the south-easternmost islet, is 231 feet (70^{m}4) high, Tenga, the highest of the group, has an elevation of 369 feet (112^{m}5), and Paniki, the north-westernmost, is 310 feet (94^{m}5) high. They are all fringed by reefs, which partly dry, and there are some detached reefs between the islets. There is a deep passage between the islets and the coast, but a reef, with a depth of 5 feet (1^{m}5) over it, lies in the eastern entrance.

A 6½-fathom (11^{m}9) patch lies just inside the 100-fathom (182^{m}9) line, about 9 miles north-eastward of Tanjong Bokabak. Beontong, a reef, with a depth of 1¾ fathoms (3^{m}2) over it, lies about 3 miles north-eastward of the same point, and is the easternmost danger off this part of the coast. Alanga riffen are two reefs, which dry, about 2½ miles north-north-eastward of Tanjong Bokabak. There are numerous dangers westward, between Beontong and Tanjong Besar, and the positions of these can best be seen on the chart. Bangkil, nearly 11 miles north-eastward of Tanjong Besar, is a low, wooded islet with a white sandy beach, and lies on the south-western part of a reef, which dries, just within the 100-fathom (182^{m}9) line. Reefs lie within a distance nearly 2 miles northward of Tanjong Besar, and the hilly islet Hoeha (Huha) lies about 1¼ miles north-north-westward of this point.

Anchorages.—Bolaäng Itang is a village about 8 miles westward of Tanjong Bokabak (*Lat. 0° 55′ N., Long. 123° 27′ E.*), and a bank of mud and stones, with depths of less than 3 fathoms (5^{m}5) over it, extends nearly half a mile from the coast here. Anchorage may be obtained by vessels with local knowledge off the village, in a depth of

Charts 943, 942a, 1263.

Chart 3195.

13 fathoms ($23^{m}8$). Miangah, a reef, with a depth of 3¼ fathoms ($5^{m}9$) over it, lies about 1½ miles northward of Bolaäng Itang. There is also anchorage for vessels with local knowledge off Kaidipang village, about 2½ miles westward of Bolaäng Itang and the residence of the native chief, in a depth of 9 fathoms ($16^{m}5$).

Tanjong Lobok lies about half a mile northward of Kaidipang, and immediately westward of this point is Labuan Broko; this bay is mostly occupied by a reef, which dries, extending from the eastern shore, on which are the islets Damar and Nanggoelet, but southward of this reef is a circular basin, with depths of from one to 2¼ fathoms ($1^{m}8$ to $4^{m}1$), affording sheltered anchorage for small vessels with local knowledge. The basin is entered through a narrow passage, with a least depth of one fathom ($1^{m}8$), between Damar and the western shore of the bay. Larger vessels can anchor south-south-eastward of the rocky north-western entrance point of the bay, in depths of from 5 to 6 fathoms ($9^{m}1$ to $11^{m}0$), but they are exposed to easterly and northerly winds.

The coast between Tanjong Doelang (Dulang), nearly 2½ miles north-north-westward of Tanjong Lobok, and Tanjong Besar, is seldom visited. Telok Boekoe (Buku), which is entered westward of Tanjong Belongkoh, about 5 miles westward of Tanjong Doelang, is unsafe during the north monsoon; Java and Minanga are reefs lying off the entrance, about 3 miles west-north-westward and 3¼ miles westward, respectively, of Tanjong Belongkoh, and Lolombatto, with a depth of 3 feet ($0^{m}9$) over it, lies about half a mile south-westward of the same point. *See* view facing page **612**.

Chart 2194, plan of Himana bay.

The entrance to Himana baai is about 4½ miles west-south-westward of Tanjong Belongkoh; it affords tolerably safe anchorage, in depths of from 5 to 7 fathoms ($9^{m}1$ to $12^{m}8$), but the space is restricted by a bank of sand, mud, and stones, which partly dries, occupying the whole of the inner part of the bay, whilst a detached reef, which dries, lies on the eastern side of the bay.

Chart 3195.

Kwandang baai.—Dangers.—Beacons.—Lights.—Kwandang baai lies between Tanjong Besar and Tanjong Dondo, nearly 20 miles westward. There are numerous islands and reefs in the bay; most of the islands are moderately high and some of them are inhabited, and the reefs are generally marked by discoloration. Antoinette, a reef, with a depth of 2 feet ($0^{m}6$) over it, lies about 2½ miles south-westward of Tanjong Besar, and a black beacon, surmounted by a cone, stands on its western side; Phoenix, a reef, about 2½ miles southward of Antoinette, is marked by a white beacon, surmounted by a ball; a black beacon, surmounted by a cone, marks the southern side of a reef which dries, lying about 1¾ miles northward of Otangala, an island at the head of the bay.

A light is exhibited, at an elevation of 46 feet ($14^{m}0$), from a rock, painted white, near the north-east point of Hoelawa (Hulawa), an islet lying about 3 miles westward of Tanjong Besar.

A light (*Lat. 0° 51′ N., Long. 122° 54′ E.*) is exhibited, at an elevation of 17 feet ($5^{m}2$), from a point about 7 cables westward of the mouth of Sungei Kwandang, which flows into the south-eastern part of the bay about 6¾ miles southward of Tanjong Besar.

Charts 943, 942a, 1263.

Chart 3195.

Anchorage.—Directions.—Pajoenga (Payunga) lies in the south-eastern part of Kwandang baai, and there is safe anchorage, under practically all conditions of weather, eastward of this island, in a depth of 6 fathoms ($11^{m}0$) mud. Kwandang village stands a short distance inland, and is not visible from the roadstead. There is a Custom house on the point southward of Pajoenga, near the light-structure; the best landing place is on the western side of this point, but it can only be reached by passing northward and westward of a small islet off the point. Kwandang is connected by telephone with Gorontalo; the roadstead, which is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij, lies eastward of Pajoenga, and southward of the parallel of the beacon situated on Phoenix.

From eastward the passage to Kwandang anchorage lies between the islets Hoeha and Hoelawa, taking care to avoid a horseshoe-shaped reef extending northward from the latter, thence passing westward of the beacon marking Antoinette, and eastward of the beacon marking Phoenix (*Lat. 0° 54′ N., Long. 122° 54′ E.*).

Charts 1153, 3195.

Vessels making for the anchorage from westward can pass either northward or southward of Papaja, a flat islet about 2 miles north-north-eastward of Tanjong Dondo, and Motoeo (Motuo), an island, 860 feet ($262^{m}1$) high, nearly one mile eastward of Papaja; if taking the passage southward of Papaja care should be taken to avoid a reef, with a least depth of 3 feet ($0^{m}9$) over it, lying nearly in mid-channel. Laimoela (Laimula), a reef, with a least depth of 3¼ fathoms ($5^{m}9$) over it, lies about 2 miles northward of Motoeo. After passing through either of these passages course should be shaped to pass between Otangala and the drying reef northward, marked by a black beacon, surmounted by a cone; a reef, with a depth of 1¼ fathoms ($2^{m}3$) over it, lies about 2 miles northward of the western extremity of Otangala. At night it is advisable to keep outside the 100-fathom ($182^{m}9$) line and then pass between Hoelawa and Hoeha. Haarlemmermeer, an extensive reef, with a least depth of 1½ fathoms ($2^{m}7$) over it, lies near the 100-fathom ($182^{m}9$) line about 5 miles north-westward of Hoelawa, and is the northernmost danger off Kwandang baai.

Chart 2194, plan of Sumalata road.

Reede Soemalata.—Dangers.—Soemalata (Sumalata) village stands about 7 miles westward of Tanjong Dondo. The roadstead is protected from easterly winds by Dojanoemo (Doyanumo), a wooded island, and a reef, which dries, close southward of its eastern extremity. It is bounded by the meridians of the western extremity of Dojanoemo and the eastern extremity of Oelawa (Ulawa), a low islet about one mile west-north-westward of Dojanoemo, and by the line joining the northern extremities of these two islands. A reef, which dries, lies about 7 cables north-north-eastward of Dojanoemo.

In the north monsoon there is safe anchorage very close under the south coast of Dojanoemo, with a hawser to the shore. When approaching from eastward care should be taken to avoid a 3¾-fathom ($6^{m}9$) patch lying about 4 cables offshore and three-quarters of a mile south-eastward of the eastern extremity of Dojanoemo.

Loading and unloading is carried out by lighters. At high water landing can be safely effected on the beach at Soemalata. The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

Chart 1153.

Coast.—Off-lying islets and dangers.—Tanjong Soemalata (Sumalata), about 4 miles north-westward of Soemalata, has a hill on it 1,004 feet (306^{m}0) high. The coast between Tanjong Soemalata (*Lat. 1° 02′ N., Long. 122° 28′ E.*) and Tanjong Loboe (Lobu), about 24 miles westward, is indented by many bays and inlets, separated by high points projecting far into the sea; Tanjong Boeloli (Buloli), about 7 miles westward of Tanjong Soemalata, has two summits on it, 807 and 812 feet (246^{m}0 and 247^{m}5) high, respectively.

There is a bight entered between Tanjong Soemalata and Tanjong Bolontio, about 3¾ miles west-south-westward, and about half a cable off the eastern shore is an islet, 197 feet (60^{m}0) high.

A reef, with a least depth of 5 fathoms (9^{m}1) over it, lies about 2¾ miles north-westward of Tanjong Soemalata, and a reef, with a depth of 2½ fathoms (4^{m}6) over it, lies about 2½ miles west-north-westward of Tanjong Boeloli. Karang Tanoala, with a depth of 2¾ fathoms (5^{m}0) over it, lies about 2¾ miles west-north-westward of Tanjong Loboe. These are the only dangers within the 100-fathom (182^{m}9) line off this part of the coast except close inshore. All the banks have depths of 7 fathoms (12^{m}8) or more over them. Boelaelo (Bulaelo), an islet about 2¾ miles west-south-westward of Tanjong Boeloli, is fringed by a reef, which dries. Tolinggoela (Tolingula), an islet, 197 feet (60^{m}0) high, lies about one mile eastward of Tanjong Hoeloedebango (Huludebango), situated about 9 miles westward of Tanjong Boeloli. A reef, which dries, extends nearly half a mile northward from Tolinggoela.

Outlying reefs.—Beacons.—Boeliogoet (Buliogut) and Boelolio (Bulolio) are two steep-to reefs of sand and coral, which dry, lying about 5 miles off the coast between Tanjong Soemalata and Tanjong Boeloli; they are the only dangers outside the 100-fathom (182^{m}9) line off the northern coast of Celebes.

A beacon, surmounted by two white balls, stands on the north-eastern side of Boeliogoet, and a beacon, surmounted by a white ball, stands on the north-western side of Boelolio.

Chart 2194, plan of Paleleh and Lintidu roads.

Reede Paleleh.—Light.—Dangers.—Paleleh village stands on the western shore of the bay entered between Tanjong Loboe (chart 1153) and Tanjong Kandjai (Kanjai), about 7½ miles westward, and Lintidoe (Lintidu) village is situated about 1¼ miles southward of Tanjong Kandjai. Pulau Paleleh, about 8½ cables eastward of Paleleh village, is 98 feet (29^{m}9) high at its southern end, and is fringed by a reef, which partly dries.

A 3-fathom (5^{m}5) patch lies about one mile eastward of the southern extremity of Pulau Paleleh, and Boelilanga (Bulilanga), a reef, with a least depth of 3¾ fathoms (6^{m}9) over it, lies nearly 2 miles northward of the northern extremity of this island.

There is a pier at Tang village, about half a mile south-south-eastward of Paleleh village, and a light (*Lat. 1° 03′ N., Long. 121° 58′ E.*) is exhibited from its head. The coastal reef extends about 2 cables offshore close northward of the pier.

The best anchorage is southward of Jellesma, a small islet off the southern extremity of Pulau Paleleh, but care should be taken not to approach too closely, as a bank, with a depth of 4½ fathoms (8^{m}2) at its outer end, extends about a quarter of a mile southward from this islet.

Charts 943, 942a, 1263.

Chart 2194, plan of Paleleh and Lintidu roads.

The roadstead is visited regularly by vessels of the Koninklijke Paketvaart Maatschappij. There is a harbour doctor at Paleleh.

The roadstead is bounded by the parallels of the mouth of Sungei Tolaki, close southward of the pier at Tang, and the northern extremity of Pulau Paleleh, and by the meridian of the eastern extremity of that island.

Chart 1153.

Coast.—The coast between Tanjong Kandjai and Bwool (Bwol) village, about 30 miles westward, is generally high; the summits of Paleleh gebergte (chart 943), about 10 miles south-westward of Tanjong Kandjai, are only visible in clear weather. There are several reefs within the 100-fathom (182^{m}9) line off the coast between Tanjong Kandjai and Loeokodoka (Luokodoka) village, about 14 miles westward; there are no dangers westward of Loeokodoka.

Radja (Raja), about 5½ miles west-north-westward of Tanjong Kandjai, is a low, wooded islet lying on an extensive reef, and Karang Belanda with a rock, which dries, on it, lies about midway between. Bokki, a low, wooded islet on the southern side of a reef, which dries, lies about 2 miles south-westward of Radja and half a mile north-westward of Tanjong Londoeboe (Londubu); a detached reef, with a least depth of 5 feet (1^{m}5) over it, lies about 6 cables northward of Bokki. There is a safe passage between the latter reef and that extending from Radja, as the edges of the reefs are sharply defined by discoloration.

Loeokodoka baai and Lokodidi baai are entered about 6½ and 10½ miles westward of Tanjong Londoeboe, respectively; they are too narrow to be of any importance and a reef, with a depth of 1¾ fathoms (3^{m}2) over it, lies in the middle of the former bay. Between the two bays is a prominent wooded hill, 443 feet (135^{m}0) high.

Reede van Bwool.—Reede van Leok.—Light.—Bwool, the residence of the native prince of the district, is situated at the mouth of a rivulet in a marshy plain enclosed by mountains; about 3½ miles south-westward of the village is a prominent round hill 1,491 feet (454^{m}5) high. (*See* view facing page 612.) The houses of the village are noticeable, especially one with a zinc roof, and also a large native house on the beach; there is also a prominent flagstaff. The best anchorage for a vessel with local knowledge is in a depth of 30 fathoms (54^{m}9), about half a mile offshore; in any case it is not advisable to anchor in a depth of less than 15 fathoms (27^{m}4), as within that the depths decrease rapidly. A bank, which dries, extends about 2 cables from the mouth of the rivulet. With easterly winds the roadstead is unsafe.

Leok village, about 2 miles north-north-westward of Bwool, is the residence of a Government official; the anchorage off it is also unsafe with easterly winds. Leok and Bwool are visited regularly by vessels of the Koninklijke Paketvaart Maatschappij.

A light is occasionally exhibited, at an elevation of 14 feet (4^{m}3), at the Custom house at Leok.

Coast.—Off-lying islet and dangers.—Bilang baai, entered about 2¼ miles northward of Leok (*Lat. 1° 12′ N., Long. 121° 26′ E.*), is almost entirely filled by a bank, which dries, extending from its shores. Immediately northward of this bay is a peninsula attaining an elevation of 1,545 feet (470^{m}9) in a rounded hill on the eastern side, and appearing as an island from a distance. Karang Pantoeloeta (Pantuluta),

Charts 943, 942a, 1263.

Chart 1153.

with a least depth of 6 fathoms (11^{m}0) over it, lies within the 100-fathom (182^{m}9) line off the eastern side of this peninsula. Tanjong Kandi and Tanjong Kramat are the north-eastern and northern points of the peninsula, respectively, and anchorage can be obtained by vessels with local knowledge between these two points, in depths of from 10 to 20 fathoms (18^{m}3 to 36^{m}6), but there is sometimes a strong current here; Gantale, a bare, prominent dark rock, lies close to the coast about half a mile south-eastward of Tanjong Kandi.

Boesak (Busak), about 5½ miles south-westward of Tanjong Kramat, and about 8 cables offshore, is a rocky islet, 246 feet (75^{m}0) high, and is sometimes difficult to distinguish from the dark land behind; some shoal patches, with a least depth of 5 feet (1^{m}5) over them, lie within 1½ miles north-eastward of the islet.

Baai van Boesak (Busak), entered between Tanjong Kano, 5¾ miles south-westward of Tanjong Kramat, and Tanjong Loetoenoh (Lutuno), nearly 2 miles westward, affords anchorage to vessels with local knowledge, in depths of from 15 to 20 fathoms (27^{m}4 to 36^{m}6), about 9 cables south-westward of Pulau Boesak. Near the head of the bay are two reefs, with depths of 3 feet (0^{m}9) and 5 feet (1^{m}5) over them, respectively. Boesak (Busak) village is situated near the mouth of a rivulet flowing into the head of the bay. Except with local knowledge the bay should always be entered by passing westward of Pulau Boesak; if this islet is difficult to identify, a noticeable valley between the high mountains inland, bearing 112°, may be steered for until near the islet.

Chart 3394.

The coast between Tanjong Loetoeno and Boschkaap or Tanjong Takoedan, 14½ miles west-north-westward, is fringed by a narrow reef and the eastern part is cliffy, the remainder being low and flat. The three unimportant rivulets Lakea, Lakoang, and Binontoang flow out in the low part; some rocks lie on the coastal reef off the mouth of the Lakea, the easternmost rivulet. There are no dangers off this part of the coast, and anchorage may be obtained everywhere by vessels with local knowledge, but the depths decrease rapidly inside the 20-fathom (36^{m}6) line. Boschkaap is a high cape rising steeply from the sea, and may be identified by some yellow patches in the forest covering it.

Chart 2194, plan of Pinjang bay.

Pindjang baai.—Pindjang (Pinjang) baai, entered about 1¼ miles westward of Boschkaap, is protected by the rocky Pindjang (Pinjang) eilandjes, which lie on a reef on the western side of the bay. According to the wind good anchorage, sand bottom, can be obtained either close eastward of these islets, or farther in the bay, off Pindjang (Pinjang) village. Vessels can pass either northward or southward of Pindjang eilandjes.

Chart 3394.

Coast.—**Dangers.**—The coast between Pindjang village and Tanjong Bonto, 8 miles west-north-westward, is high and rocky until near this point, where it is low. Tanjong Koko (*Lat. 1° 21′ N., Long. 121° 00′ E.*), about 4¾ miles north-westward of Pindjang village, can be easily identified by two large rocks close off the point. Djoelih (Julih), about 1¼ miles eastward of Tanjong Koko, is a flat rock which nearly covers at high water, except for a part in the middle about 10 feet

Chart 3394.

(3^{m}0) high; between the reef on which Djoelih lies and the coast there is a clear passage about a quarter of a mile wide, with a depth of 14 fathoms (25^{m}6).

Chart 2662, plan of Reede Lingadang and Baai van Belonlioh.

A reef, with a depth of 3½ fathoms (6^{m}4) over it, lies about 3½ cables offshore and about one mile eastward of Tanjong Bonto (*Lat. 1° 21′ N., Long. 120° 57′ E.*), and a reef, with a depth of 2¼ fathoms (4^{m}1) over it, lies about 7 cables east-north-eastward of the same point; it is advisable to pass outside these two reefs.

Baai van Belonlioh.—Dangers.—Beacon.—Baai van Belonlioh, which is entered immediately westward of Tanjong Bonto, has somewhat the character of a fiord, although the land on the eastern side of the entrance is low and covered with mangroves; on the western side of the entrance is a prominent hill, with a pointed summit, 670 feet (204^{m}2) high, and a noticeable large tree stands about 6 cables north-north-westward of it. The coastal reef extends for a considerable distance from both sides of the entrance. A detached reef, with a depth of 1¾ fathoms (3^{m}2) over it, lies about 1¼ miles westward of Tanjong Bonto, and about 4 cables southward of this reef is a 5-fathom (9^{m}1) patch; both these reefs lie close outside the outer edge of the coastal reef. A white beacon, surmounted by a ball, marks the edge of the coastal reef on the western side of the entrance.

Belonlioh village is situated on the eastern shore of the bay and on the northern entrance point of Telok Assaän, a cove divided into two parts by a reef projecting from a mangrove point at its head. The cove should be entered by keeping close to the northern entrance point. Sentigi village is situated on the western shore of Baai van Belonlioh, just within the entrance; southward of this village is Telok Antjoer Banjoe, completely filled by the coastal reef. The head of the bay penetrates inland with three arms, but these are too shoal to be of any importance. A boat canal has been cut through the narrowest part of the peninsula forming the western side of Baai van Belonlioh to allow praus to pass between this bay and Lingadang.

A vessel of any size should not enter Baai van Belonlioh unless the reefs are clearly visible; the anchorage is between Sentigi and Belonlioh villages, in a depth of about 22 fathoms (40^{m}2), sand.

Dalangan is a flat, densely wooded island lying on the broad, steep-to coastal reef extending north-westward from the Sentigi peninsula. A very slight wind causes a short, turbulent sea close outside Dalangan with some smooth, mirror-like patches in between.

Reede Lingadang.—Dangers.—Lingadang village is situated on the southern side of a basin in the coastal reef, entered by a narrow passage about 2½ miles south-south-westward of Dalangan; a low point on the western side of the village is prominent from north-westward. A 2-fathom (3^{m}7) patch lies about 4 cables westward of this point. A detached reef, partly awash, lies northward of the village, and a 2¼-fathom (4^{m}1) patch lies close northward of this reef. There is sheltered anchorage at all times, in depths of from 4 to 8 fathoms (7^{m}3 to 14^{m}6), inside the basin, and vessels can safely enter when the reefs are clearly visible; native pilots cannot be trusted implicitly, but the village chief, on request, will have praus placed by the edges of the reefs for vessels leaving.

For Stroomenkaap and the coast southward, *see* pages 458–460.

Charts 943, 941b, 942a, 1263.

APPENDIX I

LIST OF PORTS AVAILABLE FOR UNDER-WATER REPAIRS, with details of Largest Dry or Floating Dock or Patent Slip at each Port.

NAME OF PORT AND TYPE OF DOCK, &c.	Length from bilge of caisson or mitre post of gates at		Maximum length of keel blocks	Breadth of entrance at		‡ Distance {below (+) above (−)} Chart datum level of			Springs rise	FLOATING DOCKS, PATENT SLIPS, &c.			REMARKS
	Coping head	Floor head		Coping	MHWS level	Sill	Blocks, at			Maximum depth over blocks		Lifting power	
							Entrance	Head		Forward	Aft		
	(1)*	(2)*	(3)	(4)†	(5)†	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Feet	Tons	
TANDJOENG PRIOK HAVEN:													
Graving dock . .	164	—	—	46	—	—	—	—	3	—	—	—	
Floating dock . .	—	—	480	75½	68½	70	—	—	—	24⅓	24⅓	8,100	
SEMARANG:													
Graving dock . .	143½	123	—	28½	—	26½	—	—	—	—	—	—	Can take vessels up to 350–400 tons.
SURABAYA:													
Graving dock . .	270	—	—	46	—	17	—	—	7	—	—	—	For vessels up to 263 feet long.
Floating dock . .	—	—	552	97	82 (clear)	84	—	—	—	24⅔	24⅔	10,000	
BALIK PAPAN . .	—	—	118	23½	—	—	—	—	—	—	—	—	For vessels up to 150 tons.

* In the case of Floating Docks, Patent Slips, &c., Column (1) = Extreme Length. Column (2) = Length on Blocks or Cradle.

† In the case of Floating Docks, Column (4) = Breadth at Top. Column (5) = Breadth at Bottom of Dock.

‡ In order to find the depths on Sill, &c., the quantities in Columns (6), (7) and (8) should be applied according to sign to the predicted or calculated height of tide as obtained from the Admiralty Tide Tables.

APPENDIX II

LIST OF PRINCIPAL PORTS, showing particulars of depths, &c.

PORT.	Depth below Chart datum level.		Rise of Tide.		REMARKS.
	In channel of approach.	In anchorage.	Spgs.	Nps.	
			Feet	Feet	
Batavia........	Outer channel Deep	5½ to 7 fms.	3¼	2½	Vessels usually proceed direct into Tandjoeng Priok haven.
	Inner channel 7 to 13 fms.		—	—	
Tandjoeng Priok haven:					
Outer harbour		31 feet	—	—	Lines of mooring buoys.
1st Inner harbour		25 feet	—	—	Vessels lie alongside quays.
2nd Inner harbour		31 feet	—	—	
Cheribon.......	4½ fms. from eastward 3 fms. from northward	4½ fms.	2	1	Good anchorage in N.W. monsoon.
Semarang......	Decreasing gradually towards the coast	2¾ to 6 fms.	3	1	Open to winds from NNE. to west. Good holding ground.
Surabaya: Western channel	26 feet in Surabaya road	5½ to 12 fms.	7	5½	Depth in Tandjoeng Perak 17 to 29 feet alongside quays. 23 feet alongside quays in Marine harbour.
Eastern channel	14 feet				
Tjilatjap.......	20 feet	Outer road 6 to 7 fms. Inner road 5 fms.	6	4	Depth alongside quays 10 to 26 feet.

PORT.	Depth below Chart datum level.		Rise of Tide.		REMARKS.
	In channel of approach.	In anchorage.	Spgs.	Nps.	
			Feet	Feet	
Banjoewangi: Northern approach	4½ to 6 fms.	Outer road 11 to 13 fms.	5	3	Good shelter in N.W. monsoon.
Southern approach	5 to 8 fms.	Inner road 4 to 7 fms.			
Bandjermasin ..	3½ feet on bar at entrance to Sungei Barito	7 to 15 feet alongside wharves	8	—	When over the bar vessels with a draught of 12 feet can reach Bandjermasin at all times.
Balik Papan ...	23 feet*	15 fms.	8½	4½	20 to 33 feet alongside piers. * In swept channel.
Tarakan	*	11 fms.	10½	7	20 to 35 feet alongside piers. * Swept channel.
Makasser	6 to 10 fms.	7 to 10 fms.	5½	—	Safe anchorage at all seasons. Depth alongside wharves 11 to 27½ feet.

APPENDIX III

LIST OF SPOTS SUITABLE FOR MAGNETIC OBSERVATIONS.

Place.	Position.	Description.
COCOS ISLANDS : West island	Lat. 12° 12′ S. Long. 96° 50′ E.	Station site approximately 315 yards south-east of southern end of air-strip and marked by concrete peg.
BATAVIA : Weltevreden	Lat. 6° 11′ S. Long. 106° 50′ E.	Two stations, A and B, established in grounds of magnetic observatory of 1911. A—13·3 metres south-west of south-west corner of foundation of absolute hut, 22·6 metres north-west of east end of brick wall at rear of grounds. B—On azimuth line from A to mark, 14·9 metres north of A and 11·3 metres west of south-west corner of foundation of absolute hut.

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PUBLICATIONS
# of the
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A complete list of the Sailing Directions, Charts and other works published by the Hydrographic Department of the Admiralty, together with a list of Agents for their sale, is contained in the "Catalogue of Admiralty Charts and other Hydrographic publications," published annually.

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SUPPLEMENT No. 3—1955

RELATING TO THE

Eastern Archipelago Pilot

VOL. II

SIXTH EDITION, 1949

CORRECTED TO 12th SEPTEMBER, 1955

Whenever reference is made to the Pilot,
this Supplement must be consulted

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Agents for the Sale of Admiralty Charts

1955

Gratis to purchasers of Eastern Archipelago Pilot, Vol. II

ADVERTISEMENT TO SUPPLEMENT No. 3.

This Supplement has been compiled by Captain F. J. B. Gibson, O.B.E., R.N., from information received in the Hydrographic Department of the Admiralty since the publication, in 1949, of the sixth edition of the Eastern Archipelago Pilot, Vol. II.

The Supplement should be retained intact for reference; its existence is to be entered on the tabular form inside the cover of the Pilot.

Whenever reference is made to the Pilot the Supplement must be consulted.

Attention is drawn to the portions which differ from the *previous Supplement* and which are indicated in the following manner:—

Additions and alterations are enclosed in broad square brackets in heavy type.

Deletions are indicated by a heavy horizontal line.

Supplement No. 2, 1953, is hereby cancelled and all information affecting the Eastern Archipelago Pilot, Vol. II, contained in Notices to Mariners, up to and including No. 2216 of 1955, has been embodied in this Supplement; for temporary and preliminary Notices to Mariners affecting this edition, the list of temporary Notices to Mariners in force, published monthly in the complete weekly edition of the Admiralty Notices to Mariners, should be consulted.

K. St. B. COLLINS,
Hydrographer of the Navy.

Hydrographic Department,
Admiralty, London,
12th September, 1955.

1562972

SUPPLEMENT No. 3, 1955

relating to the

Eastern Archipelago Pilot

VOL. II

SIXTH EDITION, 1949

(*Corrected to 12th September, 1955*)

CAUTION on front cover.—[Line 3: *For* " **1-16** " *read* " **1-19** "]

[Line 5: *After* " **BRITISH** " *insert* " **AND COMMONWEALTH**]

[Line 7: *After* " Ports " *insert* " : Stopping of Movements in Ports "]

Line 9: *Delete.*

Line 10: *For* " IV " *read* " III."

Lines 12-13: *Delete* " **STUDY** " to " **MARINERS.**" and *substitute:* —**AGENTS FOR SALE OF CHARTS AND HYDROGRAPHIC PUBLICATIONS.**

After line 17 *insert*:—

No. 3B OFFICIAL RADIO MESSAGES TO MERCHANT SHIPS.

The Mercast System.

[Line 19: *Delete* and *substitute*:—

Communications: Signals.]

[Line 20: *For* " **DANGER** " *read* " **PRACTICE AND EXERCISE.**"]

[Line 23: *Delete* " **SINGLE** "]

[Lines 24-25: *For* " **OR AIRCRAFT CARRIERS** " *read* " **, CONVOYS, AIRCRAFT CARRIERS OR OTHER WARSHIPS AT SEA AND AIRCRAFT CARRIERS AT ANCHOR** "]

[*After* line 27 *insert*:—

No. 8A WARNING SIGNALS TO DENOTE THE PRESENCE OF A SUNKEN SUBMARINE.]

[Line 29: *For* " **W/T AND R/T** " *read* " **RADIO** "]

Line 31: *For* " **AIRCRAFT MOORING BUOYS** " *read* " **MINESWEEPING OPERATIONS** "

Line 34: *For* " **TELEGRAPH** " *read* " **SUBMARINE** "

[Lines 39-40: *Delete* and *substitute*:—

No. 15 LAWS AND REGULATIONS APPERTAINING TO NAVIGATION.]

Below " No. 16 " *insert*:—

No. 17 REPORTS OF SHOALS OBTAINED BY ECHO SOUNDING.

No. 18 AREAS DANGEROUS DUE TO MINES. [SWEPT ROUTES.]

No. 19 THE INTERNATIONAL HYDROGRAPHIC BUREAU.

[**CAUTION** *facing page ii.*—Tenth paragraph: *For* " **STEAM** " *read* " **POWER** "]

Page iii.—Third paragraph.—Lines 3-4: *For* " nautical miles " read " sea-miles "

[**Page xi.**—*After* line 30 *insert*:—

View, in two parts, of northern coast of Taliaboe—Eastern extremity of Kabihoe bearing 128°, 5 miles 561
Northern coast of Taliaboe . . . . 561]

Page xiv.—*Insert* following footnote:—

Note.—Throughout this volume the vowel " oe " in Indonesian names should be rendered by the letter " u ". Where place names are concerned this, in effect, makes the alternative or obsolete name (shown in brackets) the correct rendering, thus:—

" Oedjoeng Koelon (Ujong Kulon) " *becomes* " Ujong Kulon (Oedjoeng Koelon) ".

Page xix.—*Above* the heading *insert*:—

LAWS AND REGULATIONS APPERTAINING TO NAVIGATION.

While, in the interests of the safety of shipping, the Admiralty make every endeavour to include in their hydrographic publications details of the laws and regulations of all countries appertaining to navigation, it must be clearly understood:—

(*a*) *that no liability whatever can be accepted for failure to publish details of any particular law or regulation, and*

(*b*) *that publication of the details of a law or regulation is solely for the safety and convenience of shipping and implies no recognition of the international validity of the law or regulation.*

[**Page xx.**—Line 14: *Delete* and *substitute*:—

" (*ii*) Prior to 1954, when a chart was corrected from information which was "]

[Line 16: *For* " is " *read* " was "]

[Lines 18, 27, 28: *For* " are " *read* " were "]

[Line 24: *For* " indicate " *read* " indicated "]

[Line 25: *After* " respectively " *insert* " , which would appear on later printings "]

[Line 29: *For* " may " *read* " might "]

[Line 32: *For* " does " *read* " did "]

[*After* line 32 *insert*:—

(*iii*) Since 1954, in order that more attention may be given to New Editions, Large Corrections and corrections by Notices to Mariners, and for other reasons, the making of minor corrections to chart plates as in (*ii*) has been discontinued. Information of no importance to safe and convenient navigation is instead recorded for inclusion in the next New Edition or Large Correction; or for promulgation in a later Notice to Mariners should a change of circumstance alter the importance of the information.

In consequence the small correction date enclosed in a rectangle does not appear later than 1953 on navigational charts. The date within brackets may still appear and is then an indication that magnetic compasses have been corrected for a change in variation.]

Page xxiii.—Line 5: *For* " marginal lines or underlining " *read* " broad square brackets in heavy type "

Line 6: *For* " brackets " *read* " heavy horizontal line "

[Lines 16-36: *Delete* and *substitute*:—

The volumes are normally published annually at the rate of one volume per month; however, if there are insufficient corrections to justify the publication of a new edition of any volume, this will be notified by Notice to Mariners.

Each volume will be issued with an inscription on its cover and title page stating the date to which the volume has been corrected, which will be approximately eight weeks prior to the date of its issue. Corrections or additions to each volume, which may occur between the date of correction and date of issue will be promulgated by Section III of the Weekly Edition of Admiralty Notices to Mariners announcing the publication of the new volume.

Amendments.—Important amendments are promulgated in Admiralty Notices to Mariners. In Section III of each Weekly Complete Edition of these Notices will be found additions and alterations made to Lights, Fog signals and Visual Time signals by the Notices issued during the week affected; this section also includes other amendments, particularly amendments of a Temporary nature which have not yet or will not necessitate the issue of a Notice to Mariners.

Corrections to the Light Lists may be extracted from Section III and pasted into the appropriate volume.]

[Line 43: *For* " in three volumes " *read* " as follows:—"]

[Lines 47-48: *Delete* and *substitute*:—
" distress signals, and details of the Air-sea rescue organisation."]

[Lines 50-52: *Delete* " , radiobeacons " to " signals) " and *substitute* " and radiobeacons, including air radiobeacons useful to ships; also stations giving QTG service, and calibration stations "]

[Line 56: *Delete* and *substitute*:—
" relevant codes.

Volume IV.—Meteorological Observation Stations.

Volume V.—Comprises particulars of Radio time signals, Uniform time system, Navigational warnings and Position fixing systems (Decca, Loran, Consul, etc.)."]

[**Page xxiv.**—Lines 2-5: *Delete* " A " to " IV " and *substitute*:—
" All corrections subsequent to the date of publication are promulgated in Section VI "]

[Line 10: *Delete* " Supplements " to " the "]

[**Page xxvi.**—Lines 55-56: *For* " astronomical " *read* " geographical "]

[**Page xxvii.**—Line 3: *For* " an astronomical " *read* " a geographical "]

[Line 12: *For* " astronomical " *read* " geographical "]

[**Page xxxii.**—Line 5: *For* " Volume II " *read* " Volumes II and V."]

[**Page xxxiii.**—Line 52: *For* " July " *read* " January "]

Index to Admiralty Published Charts, S.D. 34, facing page 1.—In Lat. 7° 45′ S., Long. 109° 00′ E., *insert*:—

Chart 912, Zeegat van Tjilatjap.

[Lat. 4° S., Long. 123° E., Chart 2196: *Amend* N. limit to Lat. 4° 09′ S.]

[Lat. 3¾° S., Long. 122¾° E., Chart 3148: *Amend* S. limit to Lat. 4° 31′ S.]

In Lat. 3° 00′ N., Long. 121° 30′ E.; *for* " *2676* " *read* " *2576* "

In Lat. 1° 45′ N., Long. 125° 00′ E.; *for* " *Talisei* R^{d} " *read* " *Reede Talisei* ":

for " *Likupang* R^{d} " *read* " *Reede Likoepang* ":

insert:—**930 Straat Bangka.*

Page 2.—Line 12: *Add*:—The islands are at present under the administration of the Government of Singapore which is represented by a Malayan Civil Service Administrator; in 1951 H.M. Government announced their agreement to the transfer of these islands to Australian administration, but their transfer had not yet (1953) taken place.

Page 3.—Line 6: *Add*:—Sumatra is known to the Indonesians as Andalas.

[**Page 6.**—Line 21: *For* " west-going " *read* " east-going "]

Page 10.—Line 55: *Delete* and *substitute*:—

" Djakarta and Surabaya (Surabaja in List) in Java;

Page 11.—Lines 1-3: *Delete* and *substitute*:—

" Makasser and Menado in Celebes; Occussi, Dilly (Dili in List) and Baucau in Timor.

For details of the above stations, *see* List published by the General Secretariat of the International Telecommunication Union."

[Line 22: *For* " Vol. II " *read* " Vol. V "]

Page 13.—Line 6: *For* " flagstaff " *read* " flagstaffs "

Line 7: *After* " office " *insert* " and on the commercial pier "

Third signal after line 7: *Delete* and *substitute*:—

A white triangle above a red ball, by day, or a *white* light above a *red* light, at night, denote that, owing to interruption in telephonic communication with the signal station, there is doubt as to whether the passage is safe or not; vessels seeing this signal must therefore wait until the "passage permitted" signal is shown; the Harbour Master will regulate navigation while telephonic communication is interrupted.

Lines 8-9: *Delete* and *substitute*:—

LIFE-SAVING.—Lifeboats and life-saving appliances form the principal means adopted for saving life.

The line-throwing apparatus, the principal life-saving appliance, can often be used with effect when a lifeboat is not available; its success, however, depends largely upon an intelligent co-operation on the part of the crew of the stranded vessel.

Signals.—In accordance with the International Convention for the Safety of Life at Sea, 1948, Chapter V, Regulation 16, the following signals shall be used by life-saving stations when communicating with

Page 13 continued.

ships in distress and by ships in distress when communicating with life-saving stations:—

(*a*) *Replies from shore station to distress signals made by ship:—*

Signal	Signification
By day.—White smoke signal.	" You are seen—assistance will be given as soon as possible."
By night.—White star rocket.	

(*b*) *Landing signals for the guidance of small boats bringing away the crew of a wrecked ship:—*

	Signal	Signification
(i)	*By day.*—Vertical motion of a white flag or the arms. *By night.*—Vertical motion of a *white* light or flare. A range (indication of direction) may be given by placing a steady *white* light or flare lower and in line with the observer.	" This is the best place to land."
(ii)	*By day.*—Horizontal motion of a white flag or arms extended horizontally. *By night.*—Horizontal motion of a *white* light or flare.	" Landing here highly dangerous."
(iii)	*By day.*—Horizontal motion of a white flag, followed by the placing of the white flag in the ground and the carrying of another white flag in the direction to be indicated. *By night.*—Horizontal motion of a *white* light or flare, followed by the placing of the *white* light or flare on the ground and the carrying of another *white* light or flare in the direction to be indicated.	" Landing here highly dangerous. A more favourable location to land is in the direction indicated."

(*c*) *Signals to be employed in connection with the use of shore life-saving apparatus:—*

	Signal	Signification
(i)	*By day.*—Vertical motion of a white flag or the arms. *By night.*—Vertical motion of a *white* light or flare.	*In general*—" Affirmative." *Specifically:—* " Rocket line is held." " Tail block is made fast." " Hawser is made fast." " Man is in the breeches buoy." " Haul away."
(ii)	*By day.*—Horizontal motion of a white flag or arms extended horizontally. *By night.*—Horizontal motion of a *white* light or flare.	*In general:*—" Negative." *Specifically:—* " Slack away." " Avast hauling."

Lines 10-23: *Delete* " In " to " daymark." and *substitute*:—

In Indonesian waters light-vessels exhibit a *white* light on the forestay for the purpose of showing in which direction the vessel is

Page 13 continued.
riding and, when out of position, discontinue their characteristic lights and fog signals and, by day, the International Code signal PC is displayed.

Page 16.—*After* line 24 *insert*:—

Surveying Vessels.—Caution.—Vessels of the Indonesian Government, employed on hydrographic or beaconage operations, display the signals prescribed for vessels employed on laying or lifting submarine cable. Vessels displaying such signals must be given a wide berth and passed at moderate speed, in order to avoid fouling possible towing obstructions.

[Line 25: *For* " 28 " *read* " 17 "]

[Line 26: *Delete* " Convention " to " 1926 " and *substitute* " Regulations "]

Page 26.—*For* " BATAVIA " *read* " DJAKARTA "

Page 33.—[Line 3: *For* " Java head " *read* " Tanjong Gedeh "]

Line 35: *Delete* " **Beacon.**—"

Page 34.—Line 8: *For* " mast " *read* " palm tree "

Lines 10-11: *Delete* " A black " to " which " and *substitute* " A rocky ledge "

Line 28: *After* " and " *insert* " has a clearly defined white shore line; "

Line 44: *After* " up " *insert* "; a conspicuous bushy tree stands on the northern extremity of the island "

Line 47: *After* " (0^m8) " *insert* " ; in 1950, only the northern pier was serviceable "

Line 51: *Add*:—There is an airfield south-eastward of North lagoon.

Page 35.—Line 5: *Delete* " in 1947 " to " identify." and *substitute*:—

In 1950, the wreck was a prominent object at low water, but at high water it was barely visible.

Lines 7-9: *Delete* " it is " to " directions " and *substitute* " the tower is almost invisible from seaward, being about the same height as the surrounding palm trees. Possession point can be distinguished from seaward by a clump of palm trees at its extremity "

Line 21: *After* " **cables.**—" *insert* " **Prohibited anchorage.—Buoyage.**—"

After line 24 *insert*:—

Anchorage is prohibited, northward and eastward of pecked lines on the chart, in an area westward of Direction island. Two white spherical buoys, with staff topmarks, are moored on the southern limit of this area; their positions can best be seen from the chart.

Lines 51-53: *Delete* " Cooper's " to " point."

Page 36.—Line 3: *Add*:—In 1950, the cairn was washed away; it is replaced occasionally but is not to be relied upon.

Line 5: *Add*:—In 1950, this beacon was reported to be no longer visible.

Lines 6-10: *Delete.*

Line 11: *After* " northward " *insert* " of the ruins "

Page 36 continued.

Line 15: *After* " westward " *insert* " of the ruins "

Lines 19-21: *Delete* " Cooper's " to " and "

Line 22: *After* " 096° " *insert* " , distant about 8½ cables "

Lines 44-45: *Delete* " A mooring buoy " to " berth " and *substitute* " The berth at the mooring buoy situated about 9 cables west-south-westward of the western extremity of Direction Island

Line 47: *Add*:—In 1950, it was reported that this mooring buoy was not being maintained in a serviceable condition.

Page 37.—Lines 8-9: *Delete* " The " to " above."

Lines 10-12: *Delete* " with " to " bearing " and *substitute* " along the track shown on the chart steering "

Lines 14-16: *Delete* " point." to " buoy " and *substitute* " point,"

After line 19 *insert*:—

In August 1950, H.M.S. *Loch Quoich* had occasion to enter the inner harbour owing to swell at the outer anchorage. Drawing 14 feet ($4^{m}3$) she entered as directed above and moored with both anchors in the " Blue patch," with Prison islet bearing 114°; no local assistance was available. When leaving this anchorage the vessel proceeded direct for the outer anchorage steering with Prison islet astern, bearing 122°, and experienced no difficulty.

Lines 21-22: *Delete* " after " to " buoy "

[**Page 38.**—Line 26: *For* " Vol. II " *read* " Vol. V "]

Page 39.—[Lines 15, 25-26: *For* " Java head " *read* " Tanjong Gedeh "]

Line 32: *For* " 40 feet ($6^{m}1$ to $12^{m}2$) " *read* " 80 feet ($6^{m}1$ to $24^{m}4$) "

Page 40.—Line 8: *Delete* " Christmas " to " Company " and *substitute* " British Phosphate Commissioners "

Line 12: *For* " Straits Settlement " *read* " Colony of Singapore "

Lines 15, 17: *For* " Company " *read* " Commissioners "

Line 23: *For* " three " *read* " two "

Line 24: *For* " about 50 feet ($15^{m}2$) " *read* " 31 feet ($9^{m}4$) "

Line 26: *Delete* " two northern "

Lines 28-35: *Delete* " the southern " to " length."

Line 36: *Delete* " northern and triangular "

Lines 37-39: *Delete* " beacons are " to " pier " and *substitute* " beacon is surmounted by a triangle and the rear beacon by an inverted triangle. The beacons "

Lines 40-43: *Delete* " 077°." to " 108°." and *substitute* " 095°."

Line 44: *Delete* " 1¾ " to " pier " and *substitute* " 3 cables south-south-westward of the piers "

Line 50: *For* " 154°." *read* " 147°."

Line 52: *After* " secured." *insert*:—Depths in the approach decrease very rapidly from about 100 fathoms ($182^{m}9$), about 2½ cables offshore, to from 40 to 50 fathoms ($73^{m}2$ to $92^{m}4$), about 1½ cables offshore.

Line 53: *For* " at " *read* " off "

Line 54: *After* " approach " *insert* " at slow speed "

Page 41.—Line 3: *Delete* " holds " and *substitute* " strikes the steeply-rising rocky bottom "

Line 5: *For* " Company " *read* " Commissioners "

Page 41 continued.

Lines 10-11: *Delete* " a second " to notice." and *substitute* " fires should be banked and steam ready at shortest notice."

Line 15: *Delete* and *substitute*:—

" a rate of from 2 to 3 knots. Strong and erratic currents are often experienced in the cove.

The cove can be an uncomfortable place to lie in and is often untenable if the wind is anywhere except in the south-east quadrant; during the months of November to April ships frequently have to lie off for days on end. The berth off the boat channel, described on page 40, is more secure than the berths off the phosphate piers, as the anchor cable grows right ahead when the vessel is berthed, instead of near the beam."

Lines 18-20: *Delete* " triangular " to " length," and *substitute* " southern phosphate loading pier and also on the beach about 3 cables south-south-westward of the piers, where the boat channel "

Lines 23, 25: *For* " Company's " *read* " Commissioners' "

Line 24: *Delete* and *substitute*:—

" in Flying Fish cove. Landings have also been effected at West White beach, two miles east-south-eastward of North-west point (*Lat. 10° 26′ S., Long. 105° 35′ E.*), but there is no channel approaching the shore and, owing to the ragged nature of the reef, landing there is difficult and often dangerous."

Line 27: *Add*:—Three vessels, charted by the British Phosphate Commissioners, make frequent voyages between Christmas Island and Fremantle, Western Australia, carrying phosphate and returning with stores and mails for the island.

Line 28: *Delete.*

Line 29-32: *Delete* " or coal " to " piers " and *substitute* " of any nature, and bunkers are unobtainable. Water from springs is laid on to the piers but, owing to the requirements of the local population can only be supplied to ships in limited quantity "

[**Page 42.**—Line 4: *For* " Java head " *read* " Tanjong Gedeh (Java head) "]

[Line 5: *For* " Vlakke hoek " *read* " Balimbing Pamantjasa (Flat cape) "]

[Line 12: *For* " Derde (Third) punt " *read* " Tanjong Lesung (Third point) "]

[Line 14, 21, 26: *For* " Dwars in den weg " *read* " Sangian (Thwart-way island) "]

[Line 24: *For* " Prinsen eiland " *read* " Panaitan "]

[Line 25: *For* " Krakatau " *read* " Rakata (Krakatau) "]

[**Page 43.**—Line 10: *For* " Vlaake hoek " *read* " Balimbing Pamantjasa "]

[**Page 44.**—Line 8: *For* " Eerste (First) punt " *read* " Tanjong Lajar (First point) "]

[Line 23: *For* " Java head " *read* " Tanjong Gedeh, formerly known as Java head "]

[Line 30: *For* " Prinsen eiland " *read* " Panaitan "]

[Line 36: *For* " Java head " *read* " Tanjong Gedeh "]

[Lines 38, 43-44, 45: *For* " Eerste punt " *read* " Tanjong Lajar "]

Page 44 continued.

[Line 48: *For* " Meeuwen (Mew) eiland " *read* " Peutjang (Mew island) "]

[**Views facing page 44.**—Top view: *For " Java head " read " Tanjong Gedeh "*]

[Lower view: *For " Vierde punt " read " Karang Tjikoneng "*]

[**Views facing page 45.**—Top view: *For* " Vierde punt " and " *Verde punt " read* " Karang Tjikoneng " and " *Karang Tjikoneng* "]

[Middle view, top part: *For " St. Nicolaas punt "* and *" Toppershoedje " read " Podjok "* and *" Tempurang "*]

[Middle view, lower part: *For " Dwars in den Weg "* and " St. Nicolaas punt " *read " Sangian "* and " Podjok "]

[**Page 45.**—Lines 2-3: *For* " Eerste punt " *read* " Tanjong Lajar "]

[Line 8: *For* " Tweede (Second) punt " *read* " Tanjong Alang Alang (Second point) "]

[Line 11: *For* " **Prinsen eiland.**—" and " Prinsen (Princes) eiland " *read* " **Panaitan.**—" and " Panaitan (Princes island) "]

[Lines 45, 46: *For*" Prinsen eiland " *read* " Panaitan "]

[Line 53: *For* " Tweede punt " *read* " Tanjong Alang Alang "]

[**Page 46.**—Lines 12, 14, 22: *For* " Tweede punt " *read* " Tanjong Alang Alang "]

[Lines 37-38: *For* " Derde (Third) punt " *read* " Tanjong Lesung (Third point) "]

[Lines 40, 44, 51, 53-54: *For* " Derde punt " *read* " Tanjong Lesung "]

[**Page 47.**—Lines 6, 11, 14, 30: *For* " Derde punt " *read* " Tanjong Lesung "]

[Line 45: *For* " **Lights.**—" *read* " **Light.**—"]

[**Page 48.**—Lines 5-6: *Delete.*]

[Line 7: *For* " Rots hoek " *read* " Tanjong Sorga (Rots hoek) "]

[Lines 12, 19: *For* " Rots hoek " *read* " Tanjong Sorga "]

[Lines 30, 36, 39, 40-41, 50, 54: *For* " Vierde punt " *read* " Karang Tjikoneng "]

[Line 44: *Delete* and *substitute*:—
" There is a "]

[Lines 48-49, 54: *For* " Dwars in deg weg " *read* " Sangian "]

[**Page 49.**—Line 4: *For* " Krakatoa " *read* " Rakata "]

[Lines 11, 12, 14, 37: *For* " Vierde punt " *read* " Karang Tjikoneng "]

[Line 40: *For* " St. Nicolaas punt " *read* " Podjok "]

Page 50.—[Line 2: *For* " Vierde punt " *read* " Karang Tjikoneng "]

[Line 7: *For* " **Buoys.**—" *read* " **Buoyage.**—"]

[Line 21: *For* " black truncated cone " *read* " red cylinder "]

[Lines 22-24: *Delete* " the eastern " to " westward " and *substitute* " the eastern side is marked by a conical light-buoy, painted in black and white chequers and exhibiting a *white flashing* light of *two seconds* duration *every eight seconds,* moored close westward of the southern end of Taremboe; by a beacon, surmounted by a black cone, on the

Page 50 continued.
western side of Taremboe, and by a conical buoy painted in black and white chequers moored close south-westward "]

[Line 27: *For* " black " *read* " red "]

Line 28: *For* " off " *read* " moored about half a cable eastward of "

Line 29: *After* " beacon " *insert* " , surmounted by a [black cone] topmark,"

Line 42: *Add*:—A concrete quay, about 410 feet ($125^{m}0$) in length, is situated eastward of the pier; craft with a maximum draught of 7 feet ($2^{m}1$) can berth alongside. The entrance to a prau harbour, in which there is a least depth of about 3 feet ($0^{m}9$) at low water spring tides, lies eastward of the concrete quay.

[Line 44: *For* " Oosthaven " *read* " Pandjang "]

[Lines 48-49: *For* " St. Nicolaas punt " *read* " Podjok "]

[**Page 51.**—Lines 3, 8: *For* " St. Nicolaas punt " *read* " Podjok "]

[Lines 14, 32, 36, 39, 45: *For* " Dwars in deg weg " *read* " Sangian "]

[Line 42, 44, 50: *For* " Toppershoedje " *read* " Tempurang "]

[Line 53: *For* " Vlakke hoek " and " Varkens hoek " *read* " Balimbing Pamantjasa " and Tanjong Tua "]

[**Page 52.**—Lines 14, 15, 27, 35, 40, 44, 45, 50: *For* " Vlakke hoek " *read* " Balimbing Pamantjasa "]

[Line 22: *For* " Varkens hoek " *read* " Tanjong Tua "]

[Line 26: *For* " Betoea (Betua) " *read* " Batu kechil (Betua) "]

[**Views facing page 52.**—Bottom view: *For* " *Krakatoa.*" *read* " *Rakata* "]

[**Page 56.**—Line 5: *For* " Tanjong Belantœng (Belantung) " *read* " Lubuk (Tanjong Belantung) "]

[Lines 8, 13: *For* " Tanjong Belantoeng " *read* " Lubuk "]

[**Page 57.**—Line 19: *For* " Oosthaven " *read* " Pandjang "]

Page 60.—Line 33: *After* " pier-head " *insert* " when a vessel is expected or leaving the roadstead "

Page 61.—[*After* line 23 *insert*:—

A shoal, with a depth of 5½ fathoms ($10^{m}1$) over it, lies on the eastern side of the roadstead about 2¼ miles east-south-eastward, and an 8¾-fathom ($16^{m}0$) shoal lies about 8 cables eastward, of the light-beacon mentioned above.]

[Line 29: *For* " Oosthaven " *read* " Pandjang "]

Line 39: [*Delete* " **Oosthaven.**—" to " Oosthaven " and *substitute*:— " **Pandjang.**—] **Buoyage.**—**Beacon.**—[Pandjang (Panjang)] "

Lines 39-40: *For* " natural breakwaters " *read* " a natural breakwater "

[Line 54: *Delete.*]

Page 62.—Lines [2]-11: *Delete* and *substitute*:—

The northern end of the natural breakwater, on the western side of the harbour entrance, is marked on its [north-western] side by a [conical light-buoy, painted in black and white chequers and exhibiting a *white fixed* light], and on its eastern side by a conical light-buoy

Page 62 continued.

[, painted in black and yellow chequers and] exhibiting a *green fixed* light.

The edge of the reef on the eastern side of the harbour entrance is marked by a [red] can light-buoy exhibiting a [*red*] *fixed* light.

A black and white beacon, about 30 feet ($9^{m}1$) high, stands on the north-eastern side of the entrance about 4 cables north-north-eastward of the northern extremity of the coral breakwater.

A can light-buoy, [painted in red and white chequers and] exhibiting a *red fixed* light, marks the edge of shoal water on the north-eastern side of the inner part of the harbour.

There are some mooring buoys in the harbour.

[Lines 19, 30, 31, 35-36, 38, 40, 48: *For* " Varkens hoek " *read* " Tanjong Tua "]

[Line 37: *For* " Hout eiland " *read* " Pandjurit (Hout eiland) "]

[Line 48: *For* " Steile hoek " *read* " Sumur batu (Steile hoek) "]

[**Page 63.**—Lines 6, 54: *For* " Zutphen eilanden " *read* " Pulu Sumur "]

[Lines 10, 15, 25, 29: *For* " Steile hoek " *read* " Sumur batu "]

[Line 27: *For* " **Zutphen eilanden.**—Zutphen eilanden " *read* " **Pulu Sumur.—Buoy.**—Pulu Sumur (Zutphen eilanden) "]

[Line 29: *For* " Varkens hoek " *read* " Tanjong Tua "]

[Line 38: *For* " Hoog eiland " *read* " Kandang kechil (Hoog eiland)"]

[Line 40, 45, 51: *For* " Hoog eiland " *read* " Kandang kechil "]

[Line 45: *Delete* " Hout " to " Pandjoerit " and *substitute* " Pandjurit "]

[Line 50: *For* " Gebroeders " *read* " Pulu Dua (Gebroeders) "]

[**Page 64.**—Line 2: *For* " Gebroeders " *read* " Pulu Dua "]

[Line 4: *For* " Boompjes rif " *read* " Gosong Barak (Boompjes rif) "]

[*After* line 10 *insert*:—

A black can buoy is moored about one cable westward of the southern end of Toempel.]

[Line 12: *For* " Zutphen eilanden " *read* " Pulu Sumur "]

[Line 17: *For* " **Krakatau.**—Krakatau " *read* " **Rakata.**—Rakata (Krakatau) "]

[Lines 19, 53: *For* " Varkens hoek " *read* " Tanjong Tua "]

[Lines 25, 30: *For* " Krakatau " *read* " Rakata "]

[Line 51: *For* " Toppershoedje " *read* " Tempurang "]

Page 65.—*After* line 20 *insert*:—

Danger signal.—In the event of threatened eruption of [Rakata] volcano, Djakarta radio station will broadcast the necessary warnings in Netherlands and English text.

[Lines 21, 24, 34, 36, 37, 49: *For* " Krakatau " *read* " Rakata "]

Line 32: *Add*:—In 1953 it was about 400 feet ($121^{m}9$) high.

[**Page 66.**—Lines 34, 41: *For* " Prinsen eiland " *read* " Panaitan "]

[Lines 37, 43: *For* " Vlakke hoek " *read* " Balimbing Pamantjasa "]

[Line 42: *For* " Krakatau " and " Dwars in deg weg " *read* " Rakata " and " Sangian "]

[Lines 45, 48: *For* " Krakatau " *read* " Rakata "]

Page 66 continued.
[Line 48: *For* " Vierde punt " and Toppershoedje " *read* " Karang Tjikoneng " and " Tempurang "]
[Line 50: *For* " Dwars in deg weg " *read* " Sangian "]

Page 67.—Line 28: *Add:*—Sumatra is known to the Indonesians as Andalas.
[Line 30: *For* " Gebroeders " *read* " Segama "]
[Line 34: *For* " Steile hoek " *read* " Samur batu]

[**Page 69.**—Lines 36, 39, 40, 45, 48, 52: *For* " Gebroeders " *read* " Segama "]

Page 70.—[Lines 7, 10, 14, 22, 24: *For* " Gebroeders " *read* " Segama "]
After line 19 *insert:*—
A shoal, with a depth of 26 feet ($7^{m}9$) over it, was reported to exist, in 1949, about 4 miles north-westward of Brouwers banken; its charted position is approximate.
[Line 45: *For* " Toppershoedje " *read* " Tempurang "]

Page 72.—[Lines 15-16, 18, 19-20, 28, 48-49: *For* " St. Nicolaas punt " *read* " Podjok "]
Line 48: *Delete* " **Light.**—"

Page 73.—Lines 33-34: *Delete.*
Line 40: *For* " 64 feet ($19^{m}5$) " *read* " 66 feet ($20^{m}1$) "
[Line 52: *For* " Menscheneter eiland " *read* " Pulu Laki "]

[**Page 74.**—Line 19: *For* " island " *read* " Pulu Laki "]
[Line 50: *For* " Edam " *read* " Damar besar "]
[Line 53: *For* " Tarjong " *read* " Tanjong "]

[**Page 75.**—Lines 20-22: *Delete* " A light " to Pajoeng."]
[Line 24: *For* " Struisvogel rocks " *read* " Karang besar (Struisvogel rocks) "]
[Line 36: *For* " Middelburg, an island " *read* " Pulu Rambut (Middelburg) "]
[Line 39: *For* " Middelburg " *read* " Pulu Rambut "]
[Line 44: *For* " Edam " *read* " Damar besar (Edam) "]
[Lines 49, 50, 54: *For* " Edam " *read* " Damar besar "]

Page 76.—[Line 2: *For* " black " *read* " red "]
Line 3: *Delete* " north- "
[Line 6: *For* " Alkmaar " and " Edam " *read* " Damar kechil (Alkmaar) " and " Damar besar "]
[Line 7: *For* " Enkhuizen " and " Alkmaar " *read* " Njamuk kechil (Enkhuizen) " and " Damar kechil "]
[Line 9: *For* " Leiden " and " Enkhuizen " *read* " Njamuk besar (Leiden) " and " Njamuk kechil "]
[Line 11: *For* " Leiden " *read* " Njamuk besar "]
[Line 17: *For* " Struisvogel rocks " *read* " Karang besar "]
[Line 19: *Delete* " being Karang besar "]
[Line 20: *For* " situated " *read* " being situated "]

Page 76 continued.
[Line 23: *After* " eastward of " *insert* " the south-easternmost shoal of "]
[Line 29: *For* " Menscheneter " *read* " Pulu Laki (Menscheneter) "]
[Line 41: *For* " Menscheneter " *read* " Pulu Laki "]
[Line 42: *After* " beacon " *insert* " surmounted by a truncated cone "]
[Line 43: *For* " Groot Kombuis " *read* " Pulu Lantjang (Groot Kombuis) "]
[Line 50: *For* " Klein Kombuis " *read* " Pulu Bokor (Klein Kombuis) "]
[Lines 50-51: *For* " Groot Kombuis " *read* " Pulu Lantjang "]
[Line 53: *For* " Klein Kombuis " *read* " Pulu Bokor "]
[Line 54: *For* " Groot " *read* " Pulu Lantjang "]

Page 77.—[Line 2: *Delete* " Kombuis "]
[Line 4-5, 6-7, 9-10, 13: *For* " Klein Kombuis " *read* " Pulu Bokor "]
[Line 8: *For* " Meinderts droogte " *read* " Gosong Pulu Bokor (Meinderts droogte) "]
[Line 11: *For* " cone beacon " *read* " beacon surmounted by a truncated cone "]
[Line 12: *For* " Middelburg and Amsterdam " *read* " Pulu Rambut (Middelburg) and Untung Djawa (Amsterdam) "]
[Lines 15, 17, 42: *For* " Amsterdam " *read* " Untung Djawa "]
[Lines 19, 23, 27: *For* " Middelburg " *read* " Pulu Rambut "]
[Lines 27-28: *Delete* " wooden " to " south-eastern " and *substitute* " beacon, surmounted by a black truncated cone, marks the south-western "]
[Line 35: *For* " Schiedam " *read* " Ubi kechil (Schiedam) "]
[Line 36: *For* " Rotterdam " *read* " Ubi besar (Rotterdam) "]
[Line 39: *For* " Rotterdam " *read* " Ubi besar "]
[Line 39-40: *Delete* " Oebi " to beacon."]
[Line 41: *For* " Haarlem " *read* " Ajer kechil (Haarlem) "]
[Lines 45, 47: *For* " Haarlem " *read* " Ajer kechil "]
Line 46: *After* " beacon " *insert* " with a white ball topmark "
[Line 47: *For* " Hoorn " *read* " Ajer besar (Hoorn) "]
[Line 49: *For* " Hoorn " *read* " Ajer besar "]
[Line 50: *For* " Wapen van Purmerend " *read* " Karang Djalan (Purmerend bank) "]

Page 78.—Lines 10-11: *Delete* " 31 " to " (7$^{\text{m}}$9) " and *substitute* " 39 feet, from a black framework beacon on piles, surmounted by a sphere, 33 feet (10$^{\text{m}}$1) "
[Line 14: *For* " white " *read* " red and white "]

Page 79.—[Line 10: *For* " Alkmaar " and " Edam " *read* " Damar kechil " and " Damar besar "]
[Line 30: *For* " Schiedam and Rotterdam " *read* " Ubi kechil and Ubi besar "]
[Lines 31-32: *Delete* " Onrust " to " Purmerend " and *substitute* " Pulu Kapal (Onrust), Pulu Tjipir (Kuiper), Kelar (Kerkhof) and Pulu Sakit (Purmerend) "]
[Lines 33, 37, 41: *For* " Onrust " *read* " Pulu Kapal "]
[Lines 34, 43, 47: *For* " Kuiper " *read* " Pulu Tjipir "]
[Line 37: *For* " Mathilde " *read* " Karang Perut (Mathilde) "]

Page 79 continued.

[Line 40: *For* " De Steen " and " Mathilde " *read* " Karang Pulu Kelor (De Steen) " and " Karang Perut "]

Line 42: *Delete* " , surmounted " to " triangle,"

[Line 48: *For* " Purmerend rif " *read* " Karang Pulu Sakit (Purmerend rif) "]

[Lines 49, 52: *For* " Purmerend eiland " *read* " Pulu Sakit "]

[Line 51: *For* " Wapen van Purmerend " *read* " Karang Djalan "]

Page 80.—[Lines 2, 7: *For* " Purmerend " *read* " Pulu Sakit "]

[Line 5: *For* " Rijnlands (Rynlands) droogte " *read* " Karang Tahan (Rynlands reef) "]

[Line 9: *For* " Rijnlands droogte " and " Neptunus droogte " *read* " Karang Tahan " and Karang Pasir (Neptunus reef) "]

[Lines 12, 43: *For* " Rijnlands droogte " *read* " Karang Tahan "]

[Lines 14-15, 16: *For* " Neptunus droogte " *read* " Karang Pasir "]

[Line 16: *For* " Vader Smit " *read* " Pulu Puteri (Vader Smit) "]

Line 19: [*After* " light " *insert* " of *three seconds* duration "]

[Line 20: *For* " Vader Smit " *read* " Pulu Puteri "]

Lines 20-22: *Delete* " Telegraaf " " to side." and *substitute*:—A shoal, with a depth of 2¾ fathoms ($5^{m}0$) over it, lies about 3 cables west-north-westward of Van Dorth; Telegraaf, a reef with a depth of 2½ fathoms ($4^{m}6$) over it, lies about 8 cables west-south-westward of Van Dorth and is marked on its southern side by a black can buoy.

Line 23: *For* " 4¼ fathoms ($7^{m}8$) " *read* " 4 fathoms ($7^{m}3$) "

Line 24: *For* " 2½ " *read* " 2¼ "

Lines 26-27: *Delete* " and " to " cone,"

Line 27: *For* " southward " *read* " south-south-eastward "

Lines 29-31: *Delete.*

Line 35, and elsewhere in this volume: *For* " Batavia " *read* " Djakarta (Batavia) "

Page 81.—Line 16: *For* " *53'* " *read* " *52'* "

[Lines 28-19: *For* " Neptunus droogte " *read* " Karang Pasir and Pulu Puteri "]

[Line 30: *After* " 10½ " *insert* " and 11½ " and *for* " reef " *read* " reefs "]

Lines 31-32: *Delete.*

Page 82.—Line 22: *Add*:—In 1951, the light was extinguished and the post was non-existent.

Line 35: *After* " **Lights.**—" *insert* " **Light-buoy.**—"

Lines 48-51: *Delete* " A light " to " haven." and *substitute*:—[A light is exhibited, at an elevation of 44 feet ($13^{m}4$), from an iron framework structure painted in red and white horizontal bands, 49 feet ($14^{m}9$) in height, situated on the head of the eastern of the two moles forming the outer harbour.]

Line 53: ————————————————

Page 83.—[Lines 37-39: *Delete* and *substitute*:—]

A white conical light-buoy, exhibiting a *red fixed* light when vessels are departing after sunset, marks the northern extremity of shoal water which exists on the western side of the entrance to the third inner harbour or No. 3 basin.

Page 83 continued.

After line 46 *insert*:—

Regulations.—In 1950, regulations existed whereby vessels entering were obliged to be within the harbour moles by 1815 local time; vessels were permitted to leave the harbour at night time up to 2130. Requests for pilots should be made before 1600.

[**Page 84.**—Lines 37, 38: *For* " Edam " *read* " Damar besar "]

[Line 39: *For* " Enkhuizen and Alkmaar " *read* " Njamuk kechil and Damar kechil "]

[Line 40: *For* " Leiden " *read* " Njamuk besar "]

[Lines 49, 51, 52: *For* " Menscheneter " *read* " Pulu Laki "]

[Line 53: *For* " Groot Kombuis " *read* " Pulu Lantjang "]

[Line 54: *For* " Klein Kombuis " *read* " Pulu Bokor "]

[**Page 85.**—Line 2: *For* " Struisvogel rocks " *read* " Karang besar "]

[Lines 4, 7, 9: *For* " Middelburg " *read* " Pulu Rambut "]

[Line 9: *For* " south-eastern " *read* " south-western "]

[Lines 10, 12: *For* " Amsterdam " *read* " Untung Djawa "]

[Lines 13-14: *Delete* " Haarlem " to " Leiden " and *substitute*:— " Ajer kechil and Oebi, thence southward of Ajer besar and Njamui besar "]

[Line 16: *For* " Onrust and Kuiper " *read* " Pulu Kapal and Pulu Tjipir "]

[Lines 21, 26, 28: *For* " Edam " *read* " Damar besar "]

[Line 38: *For* " Onrust " *read* " Pulu Kapal "]

[Line 39: *For* " Vader Smit " *read* " Pulu Puteri "]

[Lines 39-40: *For* " Neptunus droogte " *read* " Karang Pasir "]

[Lines 41-42: *For* " Purmerend rif " and " Purmerend eiland " *read* " Karang Pulu Sakit " and " Pulu Sakit "]

[Line 43, 44: *For* " Kuiper " *read* " Pulu Tjipir "]

[**Page 89.**—Lines 2-3: *For* " black beacon " *read* " beacon, painted in black and white horizontal bands "]

[Lines 44-45: *For* " black bands " *read* " white vertical stripes "]

Page 92.—[Line 23: *For* " painted white " *read* " painted in black and white chequers "]

After line 25 *insert*:—

Fish traps exist [about 3 miles offshore from about 3½ to 7 miles northward] of the town of Cheribon.

[Line 38: *After* " light " *insert* " and two aluminium coloured tanks situated close southward of the same main light "]

[Line 39: *Delete* " 2 fathoms " to " -east " and *substitute* " 4 fathoms (7^{m}3) over it, lies about 5 miles "]

[*After* line 41 *insert*:—]

Fishing stakes, indicated on the chart, lie about [3½ miles north-north-eastward and 2¼ miles eastward of the main harbour light.]

Lines 53-54: *Delete* " In 1948 " to " side of " and *substitute*:—In [1954], there was a depth of [6 feet (1^{m}8) between the heads of the moles, increasing to a depth of 13 feet (4^{m}0) inside the harbour.]

Page 93.—Lines 2-3: *Delete* " the inner " to " (2^{m}3)."

Line 12: *Delete* [" and " to " pier " and *substitute* " of each pier, and at the outer elbow of the western pier "]

Page 94.—[Line 5: *For* " 4½ " and " (8^{m}2) " *read* " 4¼ " and " (7^{m}8) "]

[Line 6: *For* " 2 " *read* " 1¾ "]

[Line 12: *For* " **Mooring buoy.**—" and " 6½ " *read* " **Light-buoy.**—" and " 6 "]

Lines 17-19: *Delete* " 2 " to " factory " and *substitute* " about 3 miles southward of this village are two chimneys, about 5 miles north-eastward of which "

[Line 21: *For* " painted black " *read* " painted in red and white chequers "]

[Line 22: *For* " 2 " *read* " 1½ "]

[Line 24: *For* " 4 " *read* " 2 "]

[Line 25: *For* " 8½ " *read* " 10 "]

[Lines 26-28: *Delete* " as " to " (12^{m}8) " and *substitute* " these points are extending and should be approached with caution "]

Line 34: *For* " **Buoys.**—" *read* " **Fishing stakes.**— "

After line 38 *insert*:—

Fishing stakes, indicated on the chart, may be met with about 1¾ miles north-north-eastward, from about 2¼ to 2½ miles north-eastward and from about 2½ to 3 miles east-north-eastward of the main light-structure at Tegal.

Line 43: *After* " vessel." *insert*:—The harbour is approached between two piers or breakwaters extending north-north-westward from the coast.

Line 49: *Delete* and *substitute*:—

In March 1950, the least depth in the harbour entrance was 6 feet (1^{m}8).

Line 52: *For* " at the root " *read* " off the head "

Line 54: *Delete.*

Page 95.—Lines 2-3: *Delete.*

Line 4: *After* " from " *insert* " a wooden mast on "

[Lines 9-10: *For* " black beacon " *read* " beacon, painted in red and white horizontal bands "]

Line 10: *After* " on " *insert* " the western side of the reef surrounding."

Lines 11-13: *Delete.*

[Lines 36-37: *Delete* " A white " to " rock." and *substitute*:—A conical buoy, painted in black and yellow chequers and surmounted by a black diamond, is moored about 9 cables north-eastward of Pemalang rock.]

Page 96.—[Line 30: *After* " 72) " *insert* " ; the point is extending eastward "]

Line 32: *For* " **Beacon.**—" *read* " **Light-buoy.**— "

Lines 36-37: *Delete* " a white " to " the beacon " and *substitute* " the reef "

After line 44 *insert*:—

[A conical light-buoy, painted in black and white chequers], exhibiting a *white flashing* light of *five seconds* duration *every twelve seconds*, is moored on the north-western side of Korowelang rif.

[Line 48: *After* " **Lights.**—" *insert* " **Buoy.**—"]

Page 97.—Lines 18-20: *Delete* " above; " to " head." and *substitute* " above.

A light is exhibited, at an elevation of 15 feet (4^{m}6), from a white iron framework structure, 16 feet (4^{m}9) in height, on the head of the eastern mole; another light is exhibited from a position about 3¾ cables southward of the head of this mole.

[A spherical buoy, painted in red and white chequers, is moored about 1½ miles north-eastward of the head of the eastern mole."]

Line 21: *For* " **Obstruction.**—" *read* " **Obstructions.**—"

Line 22: *After* " mole " *insert* " ; another obstruction lies about 1½ cables eastward of the foregoing obstruction "

After line 45 *insert*:—

Traffic signals.—The following day signals are displayed vertically at the flagstaff of the Harbour office for the guidance of vessels entering or leaving the harbour:—

Signal	*Signification*
Two cones, points together, with a ball between them.	Entrance permitted; praus forbidden to depart.
Two balls, with a cone, point up, between them.	Departure permitted; praus forbidden to enter.

Pilotage.—Vessels entering can obtain the services of a pilot on request to the Harbour Master.

Page 100.—Line 35: *After* " island " *insert* " , but in 1947 it was reported that less water than charted existed on this side of the island "

[**Page 104.**—Line 15: *For* " **danger.**—" *read* " **dangers.**—"]

[*After* line 20 *insert*:—

A shoal, with a depth of 6 fathoms (11^{m}0) over it, lies about 57 miles north-eastward of the northern extremity of Genting.]

Page 105.—Lines 18: *Delete* " *See* " to " 934."

Page 106.—*After* line 37 *insert*:—

Obstruction.—An obstruction (chart 1653b), with a depth of 49 feet (14^{m}9) over it, and probably due to the existence of a wreck, lies about 13½ miles north-north-eastward of the town of Rembang.

[Line 41: *Delete* " , with " to " it "]

Page 108.—Lines 45-46: *Delete* " A white " to " Piring."

Line 47: [*For* " 26 feet (7^{m}9), in 1948 " *read* " 24 feet (7^{m}3), in July, 1954 "]

Line 49: *Add*:—The depth is liable to slight variation.

Page 109.—Line 8: *Delete* " has " to " Between " and *substitute* " between "

Line 16: *For* " 450 feet (137^{m}2) " *read* " 446 feet (135^{m}9) "

Page 110.—Lines 6-7: *Delete.*

Line 8: *After* " **Pilots.**—" *insert*:—Eight sea pilots are available, and there is a 24-hour service.

[Line 17: *After* " arrival." *insert*:—On account of lack of anchorage space, a large vessel bound for Surabaya *via* Western channel should

Page 110 continued.

enter that channel only at such a time as will ensure that she will not arrive at the roadstead on a strong east-going tidal stream.]

Lines 20-21: *Delete* "a grey" to "sides," and *substitute* "two masts, a black hull [with a white superstructure], and the name *Surabaja* in white on its sides,"

Line 23: *For* "11½ miles northward" *read* "11 miles north-north-eastward"

Line 27: *For* "16 feet ($4^{m}9$)" *read* "23 feet ($7^{m}0$)"

Line 34: *For* "199½°" *read* "200°"

Line 42: *After* "beacon" *insert* ", consisting of a disused light-structure,"

Page 111.—Line 2: [*For* "painted black" *read* "painted in red and white vertical stripes"]

Line 6: [*For* "painted white" *read* "No. 1, painted in black and white chequers"]

After line 8 *insert*:

[Lines 9-12: *Delete* and *substitute*:—

A red conical buoy is moored about 5 miles north-north-westward of Djamoeang Rif beacon.]

Lines 18-22: *Delete* and *substitute*:—

On the eastern side:—By a conical light-buoy, No. [2], painted [red] and exhibiting a *red flashing* light showing a flash of *two seconds* duration *every eight seconds*, moored about 2¼ miles north-north-eastward of Djamoeang Rif beacon.

Line 23: [*For* "painted black" *read* "No. 4, painted red"]

Lines 26-29: *Delete* and *substitute*:—

[A light-buoy, No. 6, painted red and exhibiting a *white flashing* light of *five seconds* duration *every fifteen seconds*, moored about 4½ miles south-south-westward of Djamoeang Rif beacon.]

On the western side:—By a light-buoy, No. [5] painted [black] and exhibiting a *white flashing* light showing a flash of *three seconds* duration *every nine seconds*, moored about 3¼ miles north-north-eastward of Djamoeang Rif beacon; by a [conical buoy, No. 7, painted in black and white chequers, and surmounted by a cone fitted with a *green* reflector,] moored about 2¾ miles north-north-eastward of Djamoeang Rif beacon; by a [conical buoy, No. 9, painted in yellow and black chequers, surmounted by a black cone and fitted with a *green* reflector,] moored about 2½ miles northward of Djamoeang Rif beacon; by a light-buoy, No. [11], painted [black] and exhibiting a *green flashing* light *every eight seconds*, moored about 6 cables northward of Djamoeang Rif beacon.

Line 30: [*For* "painted white" *read* "No. 13, painted in black and white chequers"]

Lines 33-[40]: *Delete* [and *substitute*:—

A conical light-buoy, No. 15, painted in black and white chequers, surmounted by a diamond, fitted with a *green* reflector] and exhibiting a *white flashing* light showing a flash of *three seconds* duration *every nine seconds*, [moored about 3¼ miles south-south-westward of Djamoeang Rif beacon.]

[A beacon stands on the western side of the channel about 1¾ miles northward of Djameoang Rif beacon.]

Caution.—Deep draught vessels with bad steerage must make use of the assistance of a tug between light-buoys Nos. [5] and [4.]"

Page 111 continued.

Line 50: *Delete.*

Line 54: *For* " Grissee (Grisee) " *read* " Gersik "

Page 112.—Lines 8, 11, 13, 17, 29, 39 and 41: *For* " Grissee " *read* " Gersik "

Lines 22-23: *Delete* " A light-buoy " to " and " and *substitute* " A —— conical light-buoy, No. [17, painted in black and white chequers,]"

Line 26: [*For* " A white conical buoy " *read* " A conical buoy, No. 19, painted in black and white chequers, surmounted by a diamond and fitted with a *green* reflector,"]

Line 30: *Delete* " A light-buoy " to " and " and *substitute* " A [red] conical light-buoy, No. [8]."

After line 32 *insert*:—

A 3-fathom ($5^{m}5$) patch lies nearly in mid-channel about 8 cables south-south-westward of Van Drieen rif.

Line 33: [*Delete* " A white "] to " cone " and *substitute*:—

[" A conical buoy, No. 21, painted in black and white chequers, surmounted by a diamond and fitted with a *green* reflector,"]

Line 35: *For* " white " *read* " conspicuous white "

Lines 37-38: *Delete* " 40 " to " ($11^{m}9$) " and *substitute* " 34 feet ($10^{m}4$), from a white iron mast, 33 feet ($10^{m}1$) "

[Lines 43-44: *Delete* " 11 feet " to " beacon " and *substitute*] " 36 feet ($11^{m}0$), [from a beacon painted in black and white horizontal bands "]

Lines 45-46: *Delete* "A" to "eastward" and *substitute* "A —— can light-buoy, No. [10, painted in red and white chequers,] exhibiting a *white occulting* light *every twelve seconds*, is moored on the northern side of the channel, about 2½ cables north-eastward "

Page 113.—Lines 12-13: *Delete* " 276 " to " summit " and *substitute* " 279 feet ($85^{m}0$) high "

Line 15: *After* " stands " *insert* " at an elevation of 185 feet ($56^{m}4$),"

Lines 18-23: *Delete* " A beacon " to " entrance." and *substitute*:—

A [light-] beacon, with a triangular daymark point down, stands on the head of the western extension of this pier, and a similar beacon, but with the daymark point up, stands about midway along the main pier; these two [light-] beacons, in line bearing 046°, lead towards the camber entrance. A conspicuous pyramid stands on the shore —————————, about [one cable northward] of the rear [light-]beacon; a [red] mooring buoy lies [close to the alignment of the leading light-beacons], about 2 cables south-westward of the front [light-]beacon.

Chart 934, plan of Surabaya strait.

After line 28 *insert*:—

Chart 934, plan of Surabaya road.

Line 29: *For* " The " *read* " [**Foul anchorage.**—] An "

Line 32: *Add*:—Another anchorage area, indicated by pecked lines on the chart, lies northward of Marine harbour; permission to anchor in this area must be obtained from the Harbour Master. [A small foul area, indicated on the chart, lies in the anchorage about 2 cables north-north-eastward of the eastern entrance point to Marine harbour.]

Lines 39-46: *Delete* and *substitute*:—

Prohibited anchorage.—Anchorage is dangerous, due to the existence of submarine cables, lost anchor tackle and wrecks, and is pro-

Page 113 continued.

hibited in the area covered by the plan of Surabaya road, except within the anchorage areas northward of Tandjoeng Perak and the Marine harbour which are indicated by pecked lines on the plan.

Anchorage is prohibited, within the anchorage area, off the entrance to Tandjoeng Perak, and also within a distance of about 1¾ cables northward of [Djambatan Djamrud (Rotterdam quay)].

[The eastern and western limits of the prohibited anchorage within the anchorage area are indicated by the alignment of a pair of light-beacons on each side of the entrance to Marine harbour; the eastern pair are in line bearing 172°, and the western pair when bearing 154°.

A beacon, consisting of a white rectangular notice board, is situated about half a mile eastward of the eastern point to Marine harbour; a beacon, surmounted by a white triangle, stands 400 feet (121^{m}9) south-south-westward of the notice board. Two beacons, each surmounted by a white triangle, stand on a mole about half a mile eastward of the notice board. The western and eastern pairs of beacons, in line bearing 200° and 179°, respectively, mark the western and eastern limits of a degaussing range prohibited anchorage.]

Lines 49-50: *Delete* " western " to " ball " and *substitute* " southern side by a [red] can buoy, No. [12], surmounted by [an inverted cone, and fitted with a *red* reflector "]

Lines 52-53: *Delete* and *substitute*:—

Queen Olga rif, with depths of less than 3 fathoms (5^{m}5) over it, lies east-south-eastward of Tanjong Kamal and has a least depth of 6 feet (1^{m}8) in its centre, situated about 7 cables east-south-eastward of that point.

Page 114.—Line 2: *For* " 26 feet (7^{m}9) " *read* " 20 feet (6^{m}1) "

Lines 3-16: *Delete* and *substitute*:—

" the south-western side of Queen Olga rif, about 2 cables south-westward of its shoalest part.

A narrow channel, in which there is a depth of about 3½ fathoms (6^{m}4), separates Queen Olga rif from another shoal which lies eastward of it. At the south-western end of this shoal, on the southern side of the channel, there is a rock, with a depth of less than 6 feet (1^{m}8) over it, situated about 5 cables eastward of Queen Olga Rif light-structure. The shoal, which is about 9 cables in length, has a least depth of one foot (0^{m}3) over its north-eastern part, and is marked on its northern side by [a beacon] surmounted by a [white] truncated cone; [an obstruction, indicated on the chart about 1½ cables west-south-westward of this beacon, consists of the remains of a beacon and is marked by a white drum. The] eastern extremity of the shoal is marked by a black can buoy, surmounted by a truncated cone.

There "

Lines 19-[33]: *Delete* and *substitute*:—

[A conical buoy, painted in black and white chequers, surmounted by a black cone and fitted with a *white* reflector], is moored about 5 cables south-eastward of Queen Olga light-beacon (*Lat. 7° 11′ S., Long. 112° 44′ E.*); it marks the north-western corner of the eastern anchorage area.

[A conical buoy, painted in black and white chequers and a similar

Page 114 continued.

buoy surmounted by a black cone, are moored, respectively, about one mile and 1½ miles east-south-eastward of Queen Olga Rif light-beacon; a spherical buoy and a can buoy, both painted in black and white vertical stripes are moored about midway between them.]

A red spherical buoy, with a superstructure, is moored about half a cable northward of the western entrance point of Marine harbour

Line 48: *After* " seaplanes " *insert* " in which navigation is prohibited at all times "

Line 52: [*For* " No. 1, painted white " *read* " No. 23, painted in black and white chequers "]

Page 115.—Lines 2-15: *Delete* and *substitute*:—

A red conical buoy, moored about 5½ cables south-south-westward of No. [23] light-buoy, marks the south-eastern extremity of the seaplane area. A white conical buoy and a black can buoy, moored about one cable south-westward of the red conical buoy, mark the starboard and port sides, respectively, of the entrance to a similarly buoyed channel leading through the mudflats to the seaplane base about one mile southward.

Two grey conical light-buoys, moored about one cable apart, which lie 4 cables westward of the above red conical buoy, mark the entrance to another channel leading to the seaplane base; the western of these two light-buoys exhibits a *white fixed* light, and the eastern exhibits a *red fixed* light.

Three red conical buoys, for the positions of which the chart is the best guide, lie within the seaplane area; flares are exhibited from these buoys when night flying operations are in progress.

[Lines 21-22: *For* " North pier " *read* " Pangkalan Djamrud (North pier) "]

[Line 23: *For* " North pier " and " Rotterdam quay " *read* " Pangkalan Djamrud " and " Djambatan Djamrud Utara "]

[Line 24: *For* " Amsterdam quay " *read* " Djambatan Djamrud Selatan "]

[Lines 24-25: *For* " Ijmuiden quay " *read* " Djambaton Djamrud Barat "]

[Line 25: *For* " Genua quay " *read* " Djambatan Nilam (Genoa quay) "]

[Lines 25-26, 34: *For* " Holland pier " *read* " Pangkalan Berlian (Holland pier) "]

[Line 27: *For* " Perak quay " *read* " Djambatan Perak "]

Line 29: *Add*:—There are some mooring buoys off the oiling berths at Westhavendam.

Lines 35-37: *Delete.*

Lines 39-43: *Delete* and *substitute*:—

" reported in [November 1954:—Djambatan Djamrud Utara, from 13 to 30 feet (4^{m}0 to 9^{m}1); Djambatan Djamrud Selatan, from 18 to 28 feet (5^{m}5 to 8^{m}5); Djambatan Djamrud Barat, from 16 to 30 feet (4^{m}9 to 9^{m}1); Djambatan Perak, from 20 to 23 feet (6^{m}1 to 7^{m}0); Djambatan Nilam, from 11 to 13 feet (3^{m}4 to 4^{m}0);] but part of [Djambatan Djamrud Utara] was unserviceable; [Pangkalan Berlian] east, north and west sides, [from 20 to 24 feet (6^{m}1 to 7^{m}3), 18 to 24 feet (5^{m}5 to 7^{m}3) and 21 to 26 feet (6^{m}4 to 7^{m}9), respectively; and, in 1951,] 30 feet (9^{m}1) alongside the oiling berth at Westhavendam.

Obstruction.—An obstruction, over which there is a least depth

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of 28 feet ($8^{m}5$), lies close off the north-eastern part of [Djambatan Djamrud Utara."]

Line 44: *After* " **harbour.**—" *insert* " **Lights.**—"

Lines 48-53: *Delete* and *substitute*:—
" 1949, there was a least depth of 21 feet ($6^{m}4$) alongside Kruiser quay, and of 23 feet ($7^{m}0$) alongside Madoera quay.

Two lights are exhibited from beacons on each side of the entrance to Marine harbour [which in line, bearing 172° and 154°, respectively, indicate the eastern and western limits of the prohibited anchorage separating the anchorage areas; *see* page 113.]

Semampir [eastern and western piers], equipped with pipes for loading and discharging petroleum [are] situated about three-quarters of a cable [and 2 cables, respectively,] eastward of the eastern end of Madoera quay. [The berth at each pier consists of a central **T** head, 69 feet ($21^{m}0$) in length, extended by dolphins to a total length of 262 feet ($79^{m}9$). In 1955,], the least depth alongside [the eastern pier was 39 feet ($11^{m}9$), and alongside the western 32 feet ($9^{m}8$)."]

Line 54: *After* " **signals.**—" *insert*:—Special signals are in force for vessels approaching the harbours, and are displayed from the Harbour office; a cone, point up, denotes that the vessel must await the Harbour pilot; one cylindrical shape, indicates that the vessel must anchor; two cylindrical shapes, disposed vertically, indicate that the vessel must moor.

Page 116.—*After* line 10 *insert*:—

Two *red fixed* lights, exhibited from the Harbour office, indicate that firing practice is taking place in the eastern entrance to the harbour.

Line 11: *After* " **Pilotage.**—" *insert*:—Three harbour pilots are available; except in emergency, pilotage is only carried out during daylight hours.

Line 12: *Add*:—Two pilot vessels and three mooring boats are stationed near the Harbour office; pilot vessels display the flag H of the International Code of Signals.

Line 17: *For* " Batavia " *read* " Djakarta (Batavia) "

Line 24: *After* " **facilities.**—" *insert*:—There are six deep-water quays, equipped with 5-ton and 3-ton cranes and one of 15 tons capacity, available for berthing; three floating cranes of 200, 75 and 30 tons capacity, respectively, are maintained in the harbour, and there is a fleet of 29 lighters; the 75-ton floating crane is self-propelled.

[Line 25: *For* " Genua quay " *read* " Djambatan Nilam "]

Line 29: *For* " Rotterdam quay " *read* " a berth on Westhavendam "

Line 33: *For* " water lighters " *read* " one 400-ton water lighter, equipped with pumps,"

Line 35: *For* " two " *read* " four "

Lines 42-45: *Delete* " Maatschappij " to " docks " and *substitute* " Maatschappij. There are three floating docks, and one small graving dock "

Line 46: *Add*:—There is a slipway for small vessels and praus, and two building slipways.

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[Line 53: *For* " Rotterdam quay " *read* " Djambatan Djamrud Utara "]

Page 117.—[Line 3: *For* " North pier " *read* " Pangkalan Djamrud "]

Line 4: *After* " several " *insert* " well-equipped "

After line 5 *insert*:—

Fumigation.—Disinfection and fumigation is carried out by means of sulphur cylinders and sprayers.

Line 15: *After* " **channel.**—" *insert*:—**Traffic regulation.**—Vessels proceeding through the Western channel may not overtake or pass another vessel between the Pilot Light-vessel and No. [6] light-buoy, nor between Nos. [8 and 23] light-buoys.

Lines 34-37: *Delete* and *substitute*:—

" vessel; thence she should steer to pass not more than about half a cable eastward of No. [5] light-buoy marking the western side of the outer end of the dredged channel; thence she should steer about 218° for No. [2] light-buoy marking the eastern side of the channel; she should pass the same distance westward of this light-buoy and when past it she should steer to bring the leading lights into line bearing 200°; she "

Line 39: *For* " No. 16 light-buoy." *read* " No. [11] light-buoy; No. [11] light-buoy lies in the centre of the channel and may be passed on either side."

Lines 40-43: *Delete* " between " to " 180°," and *substitute* " close north-westward of No. [6] light-buoy she should steer about 220° until the light-structure on Ujong Piring bears 170°,"

Line 44: *For* " eastward " *read* " westward "

Page 118.—Lines 7-8: *Delete* " ; vessels " to " light-buoy "

Line 11: [No. 8 light-buoy " *read* " a light-buoy painted in red and white vertical stripes,"]

Lines 15-16: *For* [" 1949 " and] " 14 feet ($4^{m}3$)." *read* [" 1953 " and] " 13 feet ($4^{m}0$)."

Page 119.—Line 11: *For* " 1¼ " *read* " 1½ "

Line 14: *Delete* and *substitute*:—

Prohibited area.—A prohibited area is indicated on the chart by a pecked circle, of radius about 1½ miles, inscribed around Karang Lantoeng.

Line 15: *For* " **Buoyage.**— " *read* " **Lights.—Buoyage.—Fish traps.**— "

Line 16: [*Delete* " No. 8 " to " bands " and *substitute* " painted in red and white vertical stripes "]

Line 18: *For* [" No. 7, painted white " *read* " No. 1, painted in black and white chequers "]

Lines 21-22: *Delete* and *substitute*:—

" A [red] spherical light-buoy, No. [2] exhibiting a *red flashing* light of *five seconds* duration *every twelve seconds*, is moored about "

Line 24: *For* " 5, [painted white "] *read* ["3, painted black "]

Line 27: *For* " beacons " *read* " light-beacons [, painted red]"

Line 30: *Add*:—The light on Castor beaconis exhibited at an elevation of 20 feet ($6^{m}1$).

Line 31: *For* " 4 " *read* " 5 "

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[Lines 31-32: *For* " horizontal bands " *read* " chequers "]

Line 33: *For* " 2¾ " *read* " 3½ "

Lines 34, 37, 39: *For* " beacon " *read* " light-beacon "

Lines 40-42: *Delete.*

Line 43: *For* [" No. 2, painted white " *read* " No. 7, painted in black and white chequers "]

After line 46 *insert*:—

Leading lights for Jansen's channel are exhibited from the Madoera shore, about 2¼ miles north-westward of No. [7] light-buoy; the lights are situated about 9¼ cables apart and, in line, bear 323°. [In 1954, the rear leading light was destroyed.]

There are three fish traps on the western side of the channel between Nos. 5 and [7] light-buoys; their positions can best be seen on the chart.

Line 53: *Delete* " white " to " ball " and *substitute* " conical light-buoy, No. [9], painted [black] and exhibiting a *white flashing* light of *five seconds* duration *every twelve seconds*,"

Page 120.—Line 3: *For* " 7 " *read* " [1] "

After line 3 *insert*:—

The request for a pilot should be made to Surabaya radio at least one day before arrival.

Line 16: *For* " red " [and " ball "] *read* " black " [and "truncated cone "]

Line 53: *After* " **channel.**— " *insert*:—

Traffic regulation.—Vessels proceeding through the eastern channel may not overtake or pass another vessel between [the outer and No. 9] light-buoys.

Page 121.—Line 3: *For* " 7 " *read* [1] "

After line 4 *insert*:—

Chart 934, plan of Surabaya strait.

In 1950, heavy draught vessels, having passed westward of No. [3] light-buoy, were recommended to steer direct for Pollux light-beacon; having passed about a quarter of a cable eastward of Castor light-beacon, course should again be steered towards Pollux light-beacon and, when 4 cables from it, altered slightly more northward so as to pass about a quarter of a cable eastward of it.

Line 5: *For* No. 8 " *read* [" the outer "]

Line 6: *For* " Nos. 7 and 8 " *read* [" No. 1 and the outer "]

Page 125.—Line 16: *Delete* " **Lights** " to " **Buoys** " and *substitute* " **Light.—Danger.—Buoy** "

Lines 32-34: *Delete* " A light " to " height," and *substitute* " A disused light-structure (*Lat. 7° 37′ S., Long. 112° 55′ E.*), consisting of a white iron framework structure 42 feet ($12^{m}8$) high, stands "

[Lines 37-40: *Delete* and *substitute*:—

A light is exhibited, at an elevation of 27 feet ($8^{m}2$), from a white post, 28 feet ($8^{m}5$) in height, situated on the eastern side of the entrance to Gembong rivier.]

Lines 49-50: *Delete* " The dredged " to " buoy," and *substitute*:—

There is a depth of less than 1½ feet ($0^{m}5$) in the mouth of the river; the channel is indicated by a black can buoy.

[**Page 128.**—Lines 11-12: *Delete* " a white " to " structure " and *substitute* " an iron framework structure, painted in black and white horizontal bands "]

[**Page 129.**—Line 45-50: *Delete* " a red " to " structure " and *substitute* " an iron framework structure, painted in black and white horizontal bands "]

Page 130.—Line 7: *After* " buoy " *insert* " surmounted by a ball "

After line 10 *insert*:—

A small area of foul ground is indicated on the chart about 1¼ miles north-westward of the eastern light-structure.

After line 27 *insert*:—

There are quays, suitable for lighters only, equipped with one 15-ton and one 2-ton crane.

Page 133.—Line 39: *After* " **Coast.**—" *insert* " **Buoy.**—"

Line 50: *After* " dries " *insert* " and is marked at its outer end by a black and white chequered buoy surmounted by a truncated cone "

Page 134.—Lines 52-53: *Delete* " Gili " to " rectangle." and *substitute*:—

A light is exhibited, at an elevation of 71 feet ($21^{m}6$), on Bili Doea.

Line 54: *Delete* " (Gili Wutak) "

Page 135.—Lines 9-11: *Delete.*

Line 29: *After* " by a " *insert* " truncated "

Page 138.—Line 5: *After* " **Lights.**—" *insert* " **Mooring buoys.**—"

Line 15: *After* " pier " *insert* " with depths alongside, in 1950, of from 18 to 20 feet ($5^{m}5$ to $6^{m}1$), situated "

Line 16: *Add*:—Two white mooring buoys lie [about three-quarters of a cable south-south-eastward, and several others between half a mile and one mile east-north-eastward] of the pontoon pier.

Line 24: *After* " Poeteran " *insert* " , in a depth of 9 feet ($2^{m}7$) "

Lines 26-27: *Delete* and *substitute*:—

[Leading lights are also shown on the northern side of the narrows. The rear light is exhibited, at an elevation of 48 feet ($14^{m}6$), from a white post on the pontoon pier; the front light is exhibited, at an elevation of 29 feet ($8^{m}8$), from a similar post about half a cable south-westward of the rear light. These lights in line, bearing 056°, lead from the outer leading line towards the narrows. By day the leading beacons are difficult to distinguish. When a *red* light is exhibited from the rear leading beacon no unauthorised vessel may lie at the pontoon pier.]

" **Buoy.**—**Tide-gauge.**—A white conical buoy, surmounted by a white ball, is moored on the eastern side of the channel about 7½ cables south-south-westward of "

[**Page 142.**—Line 40: *After* " **Beacons.**—" *insert* " **Buoys.**—"]

Page 143.—Line 16: *Delete* " , at " to " ($14^{m}3$) "

Line 18: *After* " post " *insert* " [, the front surmounted by a white rectangular shape, the rear by "] a white triangular topmark, point up,"

Line 22: *Add*:—In line, the leading beacons bear 359°.

[Line 27: *Add*:—The beacon situated about 7½ cables south-southeastward of the front leading beacon is surmounted by two balls and is painted in black and white horizontal bands.

A can buoy, painted in red and white chequers and surmounted by a red truncated cone, is moored about half a cable north-northeastward of Timbul, a reef, on the western side of the leading line, about 8 cables southward of the front leading beacon.

A white mooring buoy is laid about a quarter of a cable southeastward of the head of the pier.]

[**Page 147.**—Line 4: *After* " **Kangean.—**" *insert* " **Beacon.—**"]

[*After* line 13 *insert*:—

A beacon, with a rectangular topmark, stands on the summit of Soemoer Batoe.]

[Line 27: *After* " **Beacons.—**" *insert* " **Light.—**"]

[Line 34: *After* " and " *insert* " , with its beacon,"]

[Lines 46, 49: *For* " white ball " *read* " ball painted in black and white horizontal bands "]

[Line 51: *For* " white cone " *read* " black cone over a ball painted in black and white horizontal bands "]

[Line 53: *For* " white ball " *read* " black diamond over a ball painted in black and white horizontal bands "]

[**Page 148.**—*After* line 4 *insert*:—

A light is exhibited from a white wooden mast, 16 feet ($4^{m}9$) in height, at the head of the landing pier.]

[Line 25: *After* " or the " *insert* " beacon on the "]

[Line 26: *For* " white cone " *read* " black cone over a black and white ball "]

Page 149.—Line 28: *After* " beaches " *insert* " ; it was reported, in 1951, that the coastal reef had extended about 2¾ cables farther southward from the southern extremity of the island "

Page 150.—Line 50: *Add*:—Breakers were reported, in 1953, about 17 miles west-north-westward of Kwong Eng reef, as indicated on the chart.

[**Page 153.**—Line 46: *For* " Wijnkoops baai " *read* " Palaboehan Ratoe "]

[Line 51: *Delete* " Klapper or "]

[Line 53: *Delete* " Trouwers or " and *for* " Klapper " *read* " Deli "]

Page 154.—[Line 2: *For* " Klapper and Trouwers " *read* " Deli and Tindjil "]

[Line 6: *For* " Trouwers " *read* " Tindjil "

[Line 7: *Delete* and *substitute*:—

" **Palaboehan Ratoe.—**Palaboehan "]

Line 18: *For* " **Buoys** " *read* " **Buoy** "

Page 154 continued.

[Lines 20-21, 35, 46-47, 52: *For* " Wijnkoops baai " *read* " Palaboehan Ratoe "]

Lines 32-33: *Delete* " and " to " westward "

Page 156.—Lines 3-4: *Delete* " surmounted " to " cone "

Page 158.—*After* line 16 *insert*:—

Charts 1653b, 912.

Line 22: *For* " 663 feet ($202^{m}1$) " *read* " 660 feet ($201^{m}2$) "

Line 28: *For* " 607 feet ($185^{m}0$) " *read* " 604 feet ($184^{m}1$) [, from a white stone tower, 33 feet ($10^{m}1$) in height] "

After line 30 *insert*:—

Chart 1653b.

Line 44: *Delete* and *substitute*:—

Chart 912.

Lines 45-46: *Delete* " (Chilachap inlet) "

After line 55 *insert*:—

A prominent monument, consisting of a white column, stands on the northern side of the inlet, on the western side of the mouth of Kali Jasi, about 8½ cables north-westward of the northern entrance point of Zeegat van Tjilatjap.

Page 159.—Line 1: *Delete* and *substitute*:—

Chart 912.

Line 10: *Delete* " front " to " 1948." and *substitute* " outer front leading beacon was about 27 feet ($8^{m}2$) in 1950."

[Lines 11-13: *Delete* " A black " to " *03′ E.*)." and *substitute* " **Shoals.—**]

[Line 14: *For* " the same point " *read* " Tanjong Karang Bolong (*Lat. 7° 46′ S., Long. 109° 03′ E.*) "]

[Lines 21-22: *Delete* " point." to " cables " and *substitute* " point; two white conical buoys, on the northern side of the channel, lie about 3 and 4½ cables "]

Lines 35-38: *Delete* " All " to " screen." and *substitute*:—

The front beacons of the above four alignments are surmounted by a daymark consisting of a white hexagonal board; the rear beacons are surmounted by daymarks consisting of white pentagonal boards with three black stripes on them. It should be noted that the black stripes on the rear beacons do not indicate danger limits of the leading lines on any of the four alignments.

A pile beacon, surmounted by a white triangle, stands near the root of a pier about one cable in length, about 1¾ cables south-westward of the front Western screens beacon.

A shoal, with a depth of 14 feet ($4^{m}3$) over it, lies about 1½ cables north-eastward of the rear leading beacon of the outer alignment, at the deserted village of Berambang on the southern shore of the inlet.

[A shoal, with a depth of 21 feet ($6^{m}4$) over it, lies in mid-channel on the Western screens leading line, about 4 cables eastward of the rear beacon of the outer landing line.]

A shoal, with a depth of 19 feet ($5^{m}8$) over it, lies on the southern side of the channel about 4 cables north-north-westward of Berambang village; a black can buoy is moored about half a cable eastward

Page 159 continued.

of this shoal, close south-westward of the alignment of the Western Screens Leading Beacons.

Two shoals, with depths of 18 feet ($5^{m}5$) over them, lie in mid-channel about 5 cables south-westward and 6¼ cables west-south-westward, respectively, of the prominent monument at the entrance to Kali Jasi (page 158).

North-eastward of Tanjong Sodong, the channel is restricted by the 3-fathom ($5^{m}5$) line of the coastal bank on the northern shore which here extends south-westward for about 1¼ cables; a depth of 13 feet ($4^{m}0$) at the extremity of this extension is marked on its northern side by a white conical buoy.

A spit, over which there are depths of 18 feet ($5^{m}5$) and less, extends southwards at the western entrance to Kali Donan and is marked on the [eastern] side of its extremity by a black can buoy, moored about 4½ cables north-north-westward of Tanjong Sodong.

Page 160.—Line 1: *Delete* and *substitute*:—

Chart 912.

Lines 4-7: *Delete* and *substitute*:—

Prohibited anchorage.—Submarine cables.—Anchorage is prohibited in an area, indicated by pecked lines on the chart, south-westward of the northern entrance point of Zeegat van Tjilatjap. Within this area several submarine cables cross the channel; the landing positions of these cables are marked by white notice boards, the positions of which can best be seen from the chart, with "Verboden te ankeren. Zeekabel." inscribed on them.

Mooring Buoys.—A number of mooring buoys, distinguished by letters, lie in mid-channel north-westward of the prohibited anchorage area, and in Kali Donan westward of the town; for their positions the chart is the best guide.

Lines 37-42: *Delete* "10" to "$7^{m}9$)." and *substitute* "[13] feet [($4^{m}0$)] alongside in [1954]. Nos II, III and IV quays have a total length of 1,345 feet ($410^{m}0$); No. II had a depth of [13½ feet ($4^{m}2$); No. III a depth of 17 feet ($5^{m}2$), and No. IV a depth of 23 feet ($7^{m}0$) alongside; in 1954] No. IV, the southern of these quays, was only serviceable for small craft owing to the existence of an off-lying wreck."

Line 43: *For* "18 feet ($5^{m}5$)" *read* "[20½ feet ($6^{m}3$)]"

After line 46 *insert*:—

Chart 1653b.

Line 49: *Delete* "(chart 1653b)"

Line 50: *After* "Bolong" *insert* "(*Lat. 7° 46′ S., Long. 109° 03′ E.*)"

Line 54: *For* "identified. She" *read* "identified she"

Page 161.—Line 1: *Delete*, and *substitute*:—

Chart 1653b.

After line 5 *insert*:—

Chart 912.

Lines 12-29: *Delete* "Small" to "Donan"

Delete the diagrams, figs. 1 and 2.

Lines 33-34: *Delete* and *substitute*:—

"Western screens beacons are in line"

Line 36: *For* "2½" *read* "2"

Page 161 continued.

Line 39: *After* " buoys " *insert* " and the two 3-fathom ($5^{m}5$) shoals "

Line 41: *Delete* " a 2¾ " to " patch " and *substitute* " the edge of the northern coastal bank "

Page 162.—Line 1: *Delete* and *substitute*:—
Chart 912.

Page 163.—Line 16: *After* " beach " *insert* " ; there is a landing pier here, suitable for motor boats, with a warehouse near its root "

Lines 48-49: *Delete* " , and " to " boats "

Page 165.—Line 53: *After* " gradually; " *insert* " vessels are, however, advised not to anchor in depths of less than about 11 fathoms ($20^{m}1$) in this vicinity as the shoals, owing to lack of discoloration, are difficult to discern."

Page 169.—Line 26: *After* " **baai.**—" *insert* " **Shoal.**—"

After line 34 *insert*:—

A shoal, with a depth of 6½ fathoms ($11^{m}9$) over it, lies about 2¾ miles north-north-westward of Tanjong Poerwa.

Page 173.—[Line 5: *For " Pulukan road " read " Rede Pulukan "*]

[Line 9: *For* " which partly dries " *read* " partly awash at low water "]

[Lines 11-12: *For* " 1½-fathoms ($3^{m}2$) patch " *read* " shoal with a least depth of 1¾ fathoms ($3^{m}2$) over it "]

Line 23: *For* " 108 feet ($32^{m}9$) *read* " 102 feet ($31^{m}1$) "

Line 24: *Delete* " In 1945 " to " extinguished."

[Line 28: *For* " (Chandi " *read* " (Tjandi "]

[Line 35: *After* " bank " *insert* " , with a 9-fathom ($16^{m}5$) patch about one mile south-south-eastward of it,"]

[Line 41: *Delete* " *Bali* " to " *road* " and *substitute* " *Straat Bali, with plan of Rede Tjupel* "]

[Line 42: *For* " (Chupel) " *read* " (Tjupel) "]

[*After* line 52 *insert*:—
Chart 3726.]

[Line 53: *For* " Paloeanan " *read* " Paboeanan "]

Page 174.—[Line 1: *Delete* " , *Bali* " to " *road* "]

[Line 15: *For " Banyuwangi road " read " Rede Banjuwangi "*]

[Lines 16-17, 20: *For* " (Banyuwangi) " *read* " (Banjuwangi) "]

[Line 18: *Delete* " beacons "]

[Line 19: *For* " beacons " *read* " dangers "]

[Line 29: *Delete* " (New Bank) "]

[Line 33: *After* " maintained." *insert*:—A rocky 6-fathom ($11^{m}0$) patch and two shoals, with depths of 6 and 7 fathoms ($11^{m}0$ and $12^{m}8$) over them, lie respectively, about 6½ cables north-north-eastward and about 4 and 4¾ cables northward of Ommen droogte.]

Lines 40-41: *Delete* and *substitute*:—

" this harbour; in 1952 this pier was in ruins and unserviceable.

A light is exhibited from a beacon, surmounted by a red triangle, nearly half a cable northward of the ruined pier."

Page 174 continued.

Lines: 45-46: *Delete* " , at " to " situated " and *substitute* " from a white wooden beacon, surmounted by a white triangle "

Line 50: *For* " **Buoy** " *read* " **Buoyage** "

Lines 52-53: *Delete* " , and " to " cone "

[Line 54: *Delete* " (Crocodile) "]

Page 175.—[Lines 1, 35: *For* " *Banyuwangi road* " *read* " *Rede Banjuwangi* "]

[Line 2: *Delete* " black " to " cones " and *substitute* " beacon surmounted by a ball, painted in red and white horizontal bands, below a red cylinder "]

[Lines 5-6:] *Delete* " by " to [" cone "] and *substitute* " on its [northern side by a light-buoy painted in red and yellow chequers, from which a *white fixed* light is occasionally exhibited "]

Line 8: *For* " the beacon (*Lat. 6°* " *read* " Ommen droogte (*Lat. 8°* "

Line 11: *After* " light-structure " *insert* " ; it is marked on its northern side by a —— conical light-buoy [, painted in red and white vertical stripes,] from which a *green fixed* light is exhibited on request "

[Line 13: *After* " rock " *insert* " (Klip) "]

Line 15: *Delete* and *substitute*:—

" structure; it is marked on its [western side by a conical light-buoy, painted in black and white chequers, from which a *green fixed* light is occasionally exhibited."]

Line 19: *Delete* and *substitute*:—

" by a —— beacon surmounted by [a ball painted in red and white horizontal bands below a red cylinder.] A "

Line 24: *After* " light-structure " *insert* " ; the 3¼-fathom ($5^{m}9$) shoal is marked on its northern side by a white mooring buoy "

[Line 27: *For* " two white balls " *read* " two balls painted in black and white horizontal bands below a black cone "]

[Line 29: *For* " white ball " *read* " ball painted in black and white horizontal bands below a black diamond "]

Page 176.—[Line 1: *For* " *Banyuwangi road* " *read* " *Rede Banjuwangi* "]

Line 8: *After* " pass northward of " *insert* " the beacon marking "

Lines 18, 23: *For* " white conical buoy " *read* " beacon "

Line 24: *After* " patch " *insert* " , marked by the white mooring buoy,"

Line 31: *Delete* and *substitute*:—

Two powerful tugs and 12 lighters are available; also one motor boat which, for communication purposes, may be hired by visiting vessels.

There are no hospital facilities except for Indonesians; one Chinese and one Indonesian doctor are resident in the port.

Line 37: *Delete* " **Buoys.**—"

Page 177.—Lines 5-7: *Delete.*

Line 19: *After* " islet." *insert*:—A depth of 9 fathoms ($16^{m}5$) was reported, in 1953, about 1¼ miles east-north-eastward of the islet.

Line 26: *After* " height " *insert* " , surmounted by a red triangular daymark, point up "

Line 28: *After* " height " *insert* " surmounted by a red triangular daymark, point down "

Page 177 continued.
[Line 33: *Delete* " (Chandiban) "]
[Line 41: *Delete* " (Crocodile) "]

[**Page 180.**—Line 15: *For* " (Bunkulan) " *read* " Bungkulan) "]
[Line 18: *For* " (Chelukan) " *read* " (Tjelukan) "]

[**Page 182.**—Line 14: *Delete* and *substitute*:—
" marked by two beacons, each surmounted by a ball and painted in red and white horizontal bands."]
[Line 20: *Delete* and *substitute*:—
" by a beacon, painted in black and white horizontal bands, surmounted by a similarly coloured ball below a black cone."]

Page 183.—Line 6: [*Delete* " it " to " cone " and *substitute* " it] near its south-western end [; a beacon, painted in red and white horizontal bands, surmounted by a similarly coloured ball below a red cylinder,"]
Lines 26-27: *For* " a 1¾-fathom ($3^{m}2$) " *read* " an 11-foot ($3^{m}4$) "
[*After* line 28 *insert*:—
A mooring buoy is laid about 2½ cables west-north-westward of the light-structure near the Custom house.]

[**Page 184.**—Line 6: *After* " dangers " *insert* " outside it "]
[Line 28: *For* " (Bunkulan) " *read* " (Bungkulan) "]

Page 189.—[Line 33: *Add*:—In 1954, the channel was regularly used by a vessel 312 feet ($95^{m}1$) in length drawing 15 feet ($4^{m}6$).]
Line 37: *After* " was " *insert* " 19 feet ($5^{m}8$) but, further westward, the alignment of the leading beacons leads across a spit projecting northward from the southern drying reef in a depth of "
Line 44: *For* " dam " *read* " causeway "
Line 48: *For* " 23 feet ($7^{m}0$) " *read* " 21 feet ($6^{m}4$) "

Page 190.—Line 2: *After* " **Beacons.**—" *insert* " **Buoyage.—Caution.**—"
Line 3-7: *Delete* and *substitute*:—
" marked by white conical buoys and white beacons, all surmounted by white ball topmarks; the southern side of the channel is marked by black buoys, and black beacons surmounted by a black truncated cone; of these the black can buoy marking the southern side of the entrance to the narrowest part of the channel, situated about 5¼ cables eastward of the front leading beacon, is also surmounted by a truncated cone. A black beacon, surmounted by two truncated cones, stands on the southern side about 2 cables eastward of the front leading beacon [; in 1955, this beacon had disappeared]. The beacons and buoys cannot be relied upon."
Line 8: *After* " beacons " *insert* " , in line bearing 261°,"
After line 13 *insert*:—
A white beacon, surmounted by a triangle point down, stands about 1¼ cables north-north-eastward of the rear leading beacon.
Line 15: *Delete* " dam " to " of " and *substitute* " causeway, about 2 cables north-westward of the wharves on "
After line 16 *insert*:—
A shoal, with a depth of 13 feet ($4^{m}0$) over it, lies on the northern

Page 190 continued.
side of the channel about 3½ cables north-north-eastward of the rear leading beacon; it is marked on its southern side by a white conical buoy. An obstruction, consisting of the remains of a screw pile beacon, is situated about a quarter of a cable north-westward of this shoal.

Line 18: *For* " can " *read* " mooring "

Line 19: *For* " Tanjoeng Benoa " *read* " the front leading beacon "

Lines 20-22: *Delete* " A 2½- " to " shoal."

Lines 23-24: *Delete* " half " to " beacon." and *substitute* " 1¼ cables northward of the north-western extremity of Tanjoeng Benoa. An obstruction, marked on its north-eastern side by a [black can buoy] lies about 3¼ cables northward of the rear leading beacon."

Line 25: *Delete* " , marked " to " beacon,"

Line 28: *For* " cone beacon " *read* " drying reef "

Line 29: *Delete* and *substitute*:—
" 15-foot (4^{m}6) shoal, marked on its north-western side by a black mooring buoy, lies on the southern side of the channel about "

Lines 32-34: *Delete* [and *substitute*:—

An obstruction, consisting of an anchor, with a least depth of 19½ feet (5^{m}9) over it, marked by two drums, in 1955, lay about one cable southward of the flagstaff at Benoa Oedjoeng; another obstruction lies about 1¼ cables south-westward of the flagstaff.]

Page 191.—Lines 12-20: *Delete* and *substitute*:—
" near the second black cone beacon from seaward, as the depths decrease rapidly in this vicinity. After rounding the outer white ball beacon, on the northern side of the channel, she should steer north-westward in mid-channel and, having passed at a safe distance the black cone beacon which stands at the north-western end of this stretch, she should then steer for Tandjoeng Benoa bearing 276°, thus passing southward of the white conical buoy marking the 13-foot (4^{m}0) shoal in the middle of the channel. When the rear leading beacon is in line with the beacon about 1¼ cables north-north-eastward of it she should steer 315°, passing well clear north-eastward of the [black can buoy] marking the obstruction which lies north-westward. From a position northward of this [buoy] she should steer 270° and thence keep in mid-channel, giving the northern shore a good berth; thence she should steer "

Line 22: *For* " east-north-eastward " *read* " east-south-eastward "

[**Page 198.**—Line 47: *After* " **Beacons.**—" *insert* " **Buoys.**—"]

Page 199.—Lines 18-19: *Delete* [" There " to " alongside."]

[Line 20: *After* " cone," *insert* " and a black can buoy "]

[Line 22: *After* " ball," *insert* " and a white conical buoy "]

After line 28 *insert*:—

A shoal, with a depth of 7 feet (2^{m}1) over it, lies about half a cable north-westward of the black beacon situated south-westward of Lembar village. A pier, with a depth of 15 feet (4^{m}6) alongside, which in 1949 was in bad condition and could only be used during the west monsoon, lies about 1¼ cables north-westward of the same beacon; the Custom house is situated close north-eastward of the root of the pier.

[**Page 224.**—Line 21: *After* " northward; " insert " the village of Labuan Hadji lies about 2¼ miles northward of Tanjong Sarahe Tor; "]

Page 229.—Line 38: *After* " ($4^{m}0$)," *insert* " from a wooden post "

[**Page 230.**—Line 9: *Add*:—Two aircraft mooring buoys are laid about 4 cables southward of Tanjong Tampa.]

[**Page 234.**—Line 2: *For* " 507 feet ($154^{m}5$) " *read* " 512 feet ($156^{m}1$) "]

[**Page 235.**—Lines 12-13: *For* " a black iron beacon " *read* " an iron beacon painted in red and white horizontal bands "]

Page 240.—Line 16: *After* " white " *insert* " rectangular "
Lines 17-18: *Delete* " A light " to " board." and *substitute*:—
The white board is the daymark of a light-structure consisting of a white iron column, 16 feet ($4^{m}9$) in height, from which a light is occasionally exhibited at an elevation of 23 feet ($7^{m}0$); a shed, with a galvanized iron roof, stands on the seaward side of the light-structure, and a mosque is situated about 2 cables eastward.

Page 243.—Line 35: *After* " light " *insert* " occasionally "

Page 256.—Line 9: *After* " rock." *insert*:—A shoal, with a depth of [7] fathoms [($12^{m}8$)] over it, [lies about 1¼ miles] south-westward of Barsu Panda; there are heavy tide rips upon the shoal.

[**Page 261.**—Line 18: *Add*:—A shoal, with a depth of 3¾ fathoms ($6^{m}9$) over it, lies about 3 cables north-eastward of the north-eastern extremity of Padar and nearly in mid-channel between that island and Sarai, eastward.]

Page 267.—Line 46: *Delete* and *substitute*:—
" When a vessel is expected, or if a vessel is lying in the roadstead, a light is exhibited, at an elevation of 20 feet ($6^{m}1$), from a steel mast situated on "

Page 294.—Line 52: *Delete* " occasionally "

[**Page 331.**—Line 15: *After* " **Dana.—** " *insert* " **Shoal.—** "]
[*After* line 19 *insert*:—
Shoal water was reported, in 1954, about 5 miles southward of the western end of Dana.]

[**Page 338.**—Line 21: *For* " 2¾ " *read* " 2¼ "]

Page 344.—Lines 4-5: *Delete.*
Line 33: *After* " **Hainsisi.—** " *insert* " **Light.—** "
After line 41 *insert*:—
Chart 3296 plan of Kupang bay and Roti strait.
Line 44-46: *Delete* " stone " to " pier." and *substitute* " short wooden pier, connected to the shore by a stone causeway, at Tenaoe (Tenau) on the opposite side of the strait; a light is occasionally exhibited, from November to April, from a wooden post on the head

Page 344 continued.
of the pier, at an elevation of 11 feet (3^{m}4). A hard, used by landing craft, is situated one cable southward of the light-structure on the wooden pier."

After line 47 *insert*:—

Vessels anchoring off Tenaoe are recommended to do so with Tanjong Fanot bearing 022° and the head of the wooden pier bearing 124°.

Anchorage off the pier is foul owing to sunken moorings [; in 1955, anchorage was also foul about 3¼ cables west-north-westward of the head of the pier owing to a lost anchor and cable].

Page 345.—Line 25: *After* " rivier." *insert*:—A pier extends north-eastward from the coast close northward of the main light-structure; [a light is exhibited, from April till November, annually, at the head of the pier;] the Harbour office is situated close southward of the main light-structure.

Lines 27-28: *Delete* " above " to " pyramid." and *substitute* " main light-structure."

Lines 30, 35: *For* " south-western " *read* " main "

Line 31: *Delete* " the white tomb in line with "

Lines 34-36: *Delete* " There " to " structure." and *substitute*:—

There is a foul area, indicated on the chart, about 2½ cables northward of the main light-structure.

Line 38: *Delete* " by " to " office,"

Page 347.—Line 16: *After* " **Coast.**—" *insert* " **Radio station.**—"

After line 33 *insert*:—

There is a radio station at Occusi, about 2 miles west-south-westward of Tanjong Loesan Batoe. *See* page 10.

Page 348.—Lines 37-38: *Delete* " An " to " northward " and *substitute* " A beacon marks the edge of the reef on the western side about 3 cables north-north-westward "

Page 351.—[Line 8: *For* " black can " *read* " red spherical "]

[Lines 9-10: *Delete* "; a beacon " to " reef "]

[Line 12: *For* " western " *read* " northern "]

[Lines 13-15: *Delete* " black " to " reef." and *substitute* " beacon surmounted by a ball; a red spherical buoy is moored about half a cable north-north-eastward of the ball beacon."]

After line 16 *insert*:—

Light.—A light is exhibited, at an elevation of 62 feet (18^{m}9), from an iron framework structure, painted in blue and white stripes, standing on a masonry base, the whole 57 feet (17^{m}4) high, situated on Ponta Laguebada (Stanley point), at the western end of the roadstead.

Line 21: *Delete* " , at " to " roadstead "

[Lines 23-24: *Delete* " ruins " to " 139° " and *substitute* " prominent white flagstaff, about one cable southward of the ball beacon marking the southernmost reef, bears 136°, "]

[Line 29: *After* " 23^{m}8)." *insert*:—Vessels commonly lie with both anchors down and their sterns secured to trees.]

[Lines 37-40: *Delete* and *substitute*:—

There is a small tug.

There is a stone jetty about half a cable westward of the Custom

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house, but boats can land on the sandy beach on either side of it.]

After line 42 *insert*:—

Radio station.—There is a radio station at Dilly. *See* page 10.

Line 44: *After* " **Dangers.**—" *insert* " **Radio station.**—"

Page 352.—*After* line 34 *insert*:—

Baucau radio station is situated about 7 miles south-westward of Vila Salazar; *see* page 10.

Page 355.—*After* line 26 *insert*:—

In 1950, it was reported that the coastal reef extending southward from Liran had shoaled considerably and that it consisted of a steep-to bank of sand and coral, about half a mile in width, with rocks on it over which the sea breaks at low water springs; the shoal was stated to extend a distance of about 2½ miles southward of Liran light-structure (*see* below). A least depth of 12 feet ($3^{m}7$), with boulders over which there is a depth of 6 feet ($1^{m}8$), was found on this bank; at certain states of the tide heavy tide rips are noticeable at its southern extremity.

[**Page 359.**—Line 34: *For* " 625 feet ($190^{m}5$) " *read* " 669 feet ($203^{m}9$) "]

[**Page 360.**—Lines 8-9: *For* " 6 fathoms ($11^{m}0$) " *read* " 4¼ fathoms ($7^{m}8$) "]

[Line 18: *After* " colour." *insert*:—Shoal depths of 4¾ and 4¼ fathoms ($8^{m}7$ and $7^{m}8$) lie, respectively, about 3 miles west-north-westward and 1½ miles north-north-westward of the north-western extremity of Bawal.]

Page 361.—[Line 17: *For* " which dries " *read* " which nearly dries "]

Line 29: *For* " 7½ miles north-westward " *read* " 6¾ miles west-north-westward "

Line 36: *After* " it." *insert*:—A detached bank, with a depth of 6½ fathoms ($11^{m}9$) over its south-eastern end, lies about 2½ miles southward of the shoalest part of Fox shoal.

Page 363.—Line 4: *Delete* " **Buoy.**—"

Lines 17-21: *Delete* " A " to " disappeared."

Line 49: *Delete* " , after " to " buoy,"

Page 364.—Line 24: *Delete* " surmounted by a cone "

Lines 27-28: *Delete* " , on " to " huts "

After line 46 *insert*:—

Two prominent casuarina trees stand on the sandy beach about 1¼ miles westward of Tanjong Pandan, the western entrance point of the river.

Page 365.—Lines 35-39: *Delete* " ; there " to " point "

After line 43 *insert*:—

There are two unofficial leading beacons, " A " and " B ", situated near Sungei Amang village; these beacons, which in line bear 347°, are difficult to identify.

Page 366.—Line 26: *After* " **baai.**—" *insert* " **Beacon.**—"
Lines 35-36: *Delete* " difficult to identify " and *substitute* " on which stands a beacon with a white triangular daymark, point up "
Lines 45-46: *Delete* and *substitute*:—
A [red] can buoy, surmounted by a [red cylinder] and reflectors, is moored about 3 miles north-eastward of Tanjong Bandaran and marks the extremity of the sandbank which extends from that point.
Line 47: *For* " black " *read* " [black and white chequers] "
Line 48: *For* " 3¼ " *read* " 3 "

Page 367.—Lines 2-3: *Delete* and *substitute*:—
A white beacon stands on Tanjong Seramboet, on the eastern bank of the river entrance, about 8½ miles northward of Tanjong Bandaran.
Line 30: *For* " white " *read* " red "
Line 31: *For* " red " *read* " white "
Line 36-48: *Delete* " A vessel " to " 357° " and *substitute* " Sampit baai should be approached on a northerly course, sounding continuously and taking care to keep outside the 5-fathom (9^{m}1) line. The northerly course should be maintained until the light-buoy bears 298° when it should be steered for on that bearing. The vessel will then pass about three-quarters of a mile northward of the [red] can buoy with topmark, which marks the extremity of the sandbank extending north-eastward from Tanjong Bandaran. She should continue on the course 298° so as to pass southward of the light-buoy, and when the white reflector beacon on Tanjong Seramboet bears 358° "
Lines 53: *For* " red and black conical " *read* [red] can "

[**Page 368.**—Lines 13-14: *Delete* " a white " to " black " and *substitute* " two "]
[Line 15: *For* " cone " *read* " truncated cone "]
[Lines 16-19: *Delete.*]

Page 370.—Lines 34: *For* " 5 feet (1^{m}5) " *read* " 3 feet (0^{m}9) "
Lines 39-42: *Delete* " A vessel " to " unreliable." and *substitute*:—
In 1949, the following directions for entering the river were in force:—From seaward a vessel should steer for Tanjong Pematang bearing 031°. When Tanjong Tawas bears 289° course should be altered northward until that point bears 271°, whence the vessel should steer 026° for Tanjong Sambas, situated on the eastern side of the river about 2¼ miles north-north-eastward of Tanjong Pematang; by following these directions a least depth of 3 feet (0^{m}9) could then be carried over the bar.

Page 327.—Line 24: *For* " about 1½ " *read* " nearly 1¾ "
Lines 43-48: *Delete* and *substitute*:—
In 1951, the least depth on the bar was 3¼ feet (1^{m}0) at low water springs, on the line of the light-buoys.

Page 373.—Line 5: *For* " three " *read* " four "
Line 8: *Add*:—There is a shoal in the entrance to Sungei Martapoera which, in [1954], was extending southward; vessels should, therefore, keep to the southern side of the channel.

Page 373 continued.

After line 16 *insert*:—

Shoal.—In 1949, it was reported that the bank southward of Tanjong Pedada Toea was extending eastward. In this vicinity, a shoal with a depth of 7½ feet ($2^{m}3$) over it lies in mid-channel about 1½ miles west-north-westward of Tanjong Boeroeng; a depth of about one foot ($0^{m}3$) lies close north-westward of this shoal. In 1951 a drying bank was situated close eastward of the channel about 7 miles southward of Tanjong Pedada Toea.

[Line 19: *Delete* " black " to " bands " and *substitute* " in red and white vertical stripes "]

Line 24: *For* " white " *read* " [red] ", and *for* " *green* " *read* " *red* "

Line 26: *For* [" black " *read* " red " and *for*] " *red* " *read* " *white* "

Line 28: ————————————————

Lines 28-29: *Delete* " A white " to " Toea."

Lines 31-32: *Delete* " 13 " to " height," and *substitute* " 17 feet ($5^{m}2$), from a white hut with a wooden base "

After line 34 *insert*:—

A light is exhibited, at an elevation of 17 feet ($5^{m}2$), from a [white] wooden structure, 20 feet ($6^{m}1$) high, situated on Tanjong Telan, on the western side of the river about 4 miles north-north-eastward of Tanjong Pedada Toea

Line 39: *For* " can " *read* " drum "

Page 374.—Line 19: *After* " office " *insert* " and the flagstaff on the downstream extremity of the commercial pier "

Lines 41-51: *Delete* and *substitute*:—

Obstruction.—An obstruction, consisting of a line of posts visible over a length of 3¼ cables, extends towards the channel from the eastern shore, about 6¾ cables south-south-westward of Tanjong Poelantan light-structure (*Lat. 3° 29′ S., Long. 114° 31′ E.*).

Page 375.—Line 5: *After* " **Banjermasin.**— " *insert* " **Tide-gauge.**— "

Lines 15, 21: *For* " trading " *read* " commercial "

Line 17: *After* " alongside " *insert* " ; in 1950, it was reported thatth is pier was in poor condition and that permission of the Harbour Master was necessary before unloading heavy goods "

Line 21: *After* " pier " *insert* " ; a tide-gauge, graduated in centimetres, is situated on the downstream head of the centre of these piers "

Lines 32-34: *Delete* " Drinking " to " monsoon."

Line 36: *Delete* and *substitute*:—

There are two slipways available for repairs to small vessels.

[Lines 42-43: *For* " 2¾ cables westward " *read* " 3¼ cables eastward "]

Lines 44-47: *Delete* " 021° " to " reflector." and *substitute* " [028°, passing not more than 1½ and 2 cables, respectively, eastward of the outer and inner red light-buoys; from abeam of the inner light-buoy, the] vessel should steer for Tanjong Poelantan and, when Tanjong Pedada Toea bears 270°, she should steer for the western extremity of Tempoeroeng besar until Tanjong Poelantan is abeam; [thence fish-stakes indicate the eastern limit of the channel, and] for the remainder of the channel, the chart is the best guide. At night, from the inner light-buoy, the vessel should steer for Tanjong Poelantan

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light; when Tanjong Telan light bears north this light should be kept a little on the port bow. Northward of Tanjong Telan the ship channel runs along the western bank of the river."

Line 49: *For* " 1948 " *read* " [1955] "

Lines 51-54: *Delete.*

Page 376.—Lines 2-4: *Delete* " along " to " noticeable " and *substitute* " There is a prominent "

Lines 6-10: *Delete* and *substitute*:—

Masters of vessels without local knowledge wishing to secure alongside the pier at Bandjermasin during the ebb tidal stream are advised to turn their vessels at a distance of from 164 to 273 yards (150^{m}0 to 249^{m}6) downstream from the pier; these distances are marked by notice boards on the right bank of the river. Masters of vessels having local knowledge can turn their vessels off the pier during the flood tidal stream, but vessels more than 213 feet (64^{m}9) in length are advised not to do so.

[*After* line 17 *insert*:—

Caution.—A good look-out should be kept, especially at night, for floating islands and tree trunks, which at times drift down stream and out to sea in large masses.]

[**Page 377.**—*After* line 51 *insert*:—

Discoloured water was reported, in 1954, about 31 miles westward of Masalembo kechil.]

Page 381.—Line 34: *For* " **Light.**—" *read* " **Lights.**—"

After line 40 *insert*:—

A light is exhibited, at an elevation of 45 feet (44^{m}2), from a white iron framework structure 66 feet (20^{m}1) high, situated on the southern of the Gebroeders rocks, this light is obscured by the northern rock between the bearings of [206°-219°]

[**Page 383.**—Lines 30-31: *Delete* " The strait " to " knowledge."

[Line 39: *Delete* " **Buoys.**—"]

[**Page 384.**—Lines 33-35: *Delete.*]

Page 385.—[Lines 28-35: *Delete* and *substitute*:—

" **Main channel.**—**Beacons.**—**Buoys.**—Two disused iron framework light-structures are situated about 2¼ cables apart on the eastern side of the southern end of Soewangi, both are painted white, except the northern side of the northern and higher structure which is painted black.

A white "]

[Line 37: *For* " situated " *read* " is situated "]

[Line 38: *Delete.*]

[Line 40: *For* " front light " *read* " southern disused light-structure "]

[Lines 43, 49: *For* " light-structure " *read* " disused light-structure "]

Lines 45-47: *Delete* and *substitute*:—

" of this buoy and marks a pinnacle rock."

Line 50: *For* " close northward " *read* " about three-quarters of a cable eastward "

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[Line 52: *Delete* " A light " to " beacon " and *substitute*:—
" A beacon surmounted by a truncated cone stands "]

Page 386.—Line 5: *For* "**Light.—Buoy.—**" *read* "**Lights.—Buoyage.—**"

Line 17: *After* " white " *insert* " and red "

Line 20: *Delete* and *substitute*:—

" A light is exhibited on Tanjong Pemantjingan (page 382), at an elevation of 16 feet ($4^{m}9$), from a structure with a white triangular daymark, point up. The above two lights are in line bearing 257°.

A black conical light-buoy, from which a *red fixed* light will be exhibited on request, is moored on the southern side of the channel off the northern "

Line 22: *Delete* and *substitute*:—

" Tanjong Kemoening; a white conical buoy [surmounted by a ball] is moored on the northern side of the channel, about 1¼ miles east-north-eastward of Tanjong Pemantjingan."

Line 23: *After* "**Setagin.—**" *insert* "**Tidal stream signals.—**"

Lines 25-26: *Delete* " are " to " has " and *substitute* " is a pier with "

Lines 27-28: *Delete* " In 1948 " to " serviceable." and *substitute*:—

For the benefit of vessels berthing, the following tidal stream signals are displayed on the pier:—A red flag, indicating that the stream is running in a north-easterly direction; a blue or black flag, indicating that the stream is running in a south-westerly direction; or a white flag, indicating that it is slack water.

Lines 35-36: *Delete* " times " to " there " and *substitute* " times; in 1950, the condition of the pier had deteriorated. Provisions and fresh water are available; the water, which is not obtainable during the east monsoon, must be boiled if required for drinking purposes. There "

Line 40: *After* " mast " *insert* " , 33 feet ($10^{m}1$) high,"

Page 387.—*After* line 5 *insert*:—

For tidal stream signals displayed at Setagin, *see* page 386.

Lines 11-13: *Delete* " When " to " then " and *substituet* " Having passed the [disused] light-structure,"

[Lines 17, 27, 36, 37, 54: *For* " light- " *read* " disused light- "]

[Line 19: *Delete* " the two " to " marking "]

Lines 26, 31: *For* " white conical " *read* " black can "

Lines 27-[31]: *Delete* " eastward " to " [light-beacon.] " and *substitute* " the vessel must navigate with caution, passing westward of the white can buoy, moored about 5¾ cables north-eastward of the same [disused light-structure, and eastward of the beacon surmounted by a truncated cone."]

Line 46: *For* " can buoy " *read* " light-buoy and southward of the white [conical buoy surmounted by a ball "]

Line 47: *Add*:—Thence, the vessel should bring the light-structures on Tanjong Pemantjingan and Balingkar in line astern, bearing 257°.

Line 50: *After* " Laoet." *insert*:—The directions previously given for vessels from southward should be followed in the reverse order.

Page 388.—Lines 2-3: *Delete* " For " to " order."

Line 16: *Add*:—In 1950, the coastal reefs of Masalima and Sabaroe had extended about 1½ cables in a south-westerly and west-north-westerly direction, respectively, thus resisting the width of the passage between these islands.

After line 22 *insert*:—

For breakers, reported in 1953, about 70 miles south-westward of Aurora bank, *see* page 150.

Line 42: *After* " **eilanden.**—" *insert*:—A shoal, with a depth of 11 fathoms (20$^{\mathrm{m}}$1) over it, lies about 11½ miles north-westward of Martaban bank; in 1951, it had not been examined and its position was approximate.

Page 389.—Line 32: *For* " low, wooden point " *read* " low wooded point, from which a reef extends for about 2½ cables,"

[**Page 392.**—Line 43: *Delete* " A white " to " ball " and *substitute*:— " A black beacon, surmounted by two black cones, points up,"]

[*After* line 44 *insert*:—

A reef, with a depth of about 2¼ fathoms (4$^{\mathrm{m}}$1) over it, was reported, in 1952, to lie about 2¾ miles north-north-eastward of the beacon on Addington reef.]

Page 393.—[Line 25: *For* " white " *read* " in black and white chequers "]

[Line 29: *For* " black conical beacon " *read* " red beacon surmounted by a red cylinder "]

[Line 31: *For* " black " *read* " red "]

[Line 32: *For* " cone " *read* " red cylinder "]

[Lines 38-39: *Delete* " black " to " beacon." and *substitute* " red beacon surmounted by a red cylinder, and the northern by a conical buoy painted in black and white chequers."]

[Line 41: *For* " white ball " *read* " black cone "]

[Line 48: *Delete* " white "]

[Lines 49, 51: *For* " black cone " *read* " red "]

[Line 52: *For* " two white ball beacons " *read* " the black and white chequered buoy and a black cone beacon "]

[**Page 394.**—Line 5: *For* " black cone beacon " *read* " beacon surmounted by a red cylinder "]

[Line 9: *For* " **Beacons.**—" *read* " **Beacon.**—"]

[Line 25: *For* " black " *read* " red "]

[Line 43: *Add*:—In 1954, this buoy was reported to be missing.]

[Line 49: *For* " white " *read* " black "]

[Lines 51-52: *Delete* " An " to " light-tower."]

Page 396.—*After* line 16 *insert*:—

Union bank, with a depth of 7 fathoms (12$^{\mathrm{m}}$6) over it, lies about 23 miles south-eastward of Semarang shoal.

Line 19: *Add*:—Breakers were reported, in 1950, about 2½ miles northward of this bank.

Line 20: *After* " **group.**—" *insert* " **Dangers.**—"

After line 48 *insert*:—

In 1950, a reef over which the depth is believed to be less than

Page 396 continued.

6 feet ($1^{m}8$), was reported to lie about one mile north-westward of Byron rif; the reef, which probably extends for about 1¾ cables in a north-south direction, and is about a quarter of a cable wide, has the appearance of a discoloured patch with pronounced tide rips on it.

A stranded wreck, the mast of which was, in 1949, a very prominent object, lies on the southern side of Lamoedaän reefs, about 20 miles west-north-westward of Byron rif.

Page 397.—Line 34: *For* " **Buoy** " *read* " **Buoyage** "

[Line 42: *For* " black " and " cone " *read* " red " and " cylinder "]

After line 45 *insert*:—

A conical buoy, painted [in red and white vertical stripes] and surmounted by a [cross], is moored in the approach nearly three miles north-north-westward of Karangan reef beacon.

[Two beacons, each surmounted by a ball and painted in red and white vertical stripes, stand on the shore bank about 3 miles south-eastward and the same distance north-north-eastward of Tanjong Teriti and both about one mile offshore.]

Lines 48-50: *Delete* and *substitute*:—

" southern side by two [red] iron beacons; each surmounted by a [red cylinder]; the outer one stands about 3½ miles east-north-eastward of Tanjong Teriti and the inner one ———— about 2¾ miles east-north-eastward of the same point. A [red] can light-buoy, exhibiting a *white flashing* light of *four seconds* duration *every sixteen seconds*, is "

Page 398.—Line 15: *Add*:—In 1950, there was a least depth of about 9 feet ($2^{m}7$) alongside the pier, and mooring posts were situated both above and below it; at the same date, an obstruction, with a least depth of about 6 feet ($1^{m}8$) over it, lay close off the upstream end of the pier.

Page 399.—Line 7: *After* " **Light.**—" *insert* " **Signal station.**—"

Lines 19-20: *For* " look-out tower " *read* " signal station "

Line 21: *Add*:—Other prominent objects near the coast are a hotel with a black roof, on which is inscribed its name in white letters, about 1¾ miles eastward of the light-structure, and a yellow hangar situated about 6 miles eastward of the same place.

Line 23: *Add*:—A *red fixed* light is exhibited when firing practice is taking place in the vicinity. In the event of the failure of the main light, two *white* lights, disposed horizontally, are exhibited from the signal station on Takong hill.

Line 30: *Delete* " There " to " sunrise."

Line 33: *Delete* " 1948 " to " ($7^{m}0$)." and *substitute* " [1954], had a least depth of [25 feet ($7^{m}6$).] ————————

Line 35: *Delete* and *substitute*:—

" buoy, No. 2, painted black, fitted with a radar reflector and exhibiting a *white flashing* light showing a flash of *five seconds* duration *every twelve seconds*,"

Line 36: *For* " white conical buoy " *read* " red conical buoy, No. 3 "

Line 37: *After* " buoy," *insert* " No. 1."

Line 38: *Delete* " southward " to " light." and *substitute* " south-south-westward of the outer black light-buoy,"

Page 399 continued.

Lines 41-45: *Delete* " can " to " -westward " and *substitute* " conical buoy, No. 5, surmounted by a ball; a light-buoy, No. 9, painted white, fitted with a radar reflector and exhibiting a *white flashing* light *every sixteen seconds*; and by a white conical buoy No. 11, the latter moored nearly 2 miles southward "

Lines 48-51: *Delete* " can " to " 9 " and *substitute* " [can buoy, No. 4, surmounted by a *red* reflecting red ball]; by a light-buoy, No. 6, painted black and exhibiting a *red flashing* light showing a *short* flash *every five seconds*; by a black can buoy, No. 7; by a black can buoy, No. 8, surmounted by a truncated cone; by a black can buoy, No. 10; and by a light-buoy, No. 12 "

Line 52: *For* " *every five* " *read* " of *five seconds* duration *every twelve* "

Page 400.—Lines 1-3: *Delete.*

Line 5: *For* " **Beacons.**—" *read* " **Beacon.**—"

Lines 13-16: *Delete* " A " to " shoal." and *substitute*:—

[It is marked at its southern end by a light-buoy, painted in black and white chequers and exhibiting a *red fixed* light; at its north-western end by a white ball beacon, and about 1¼ cables northward of its northern end by a light-buoy, painted in red and black chequers and exhibiting a *white fixed* light.]

A narrow shoal, about 9 cables in length, lies with its southern extremity about 4½ cables north-westward of the above shoal; a least depth of 16 feet ($4^{m}9$) exists on this shoal and is situated about 13½ cables north-north-westward of Tokong light-structure.

Lines 18-21: *Delete* " There " to " light-structure."

Lines 23-33: *Delete* "The southernmost" to "ruins." and *substitute*:—

Government pier, the southernmost of these, lies close northward of Tokong light-structure; the remainder are numbered from I to VII in a northerly direction, No. I pier that nearest the Government pier and situated with its south-western extremity about 2½ cables northward of the light-structure. Nos. I and II piers, which are built of concrete, form one whole structure.

In 1953, the available lengths of berths and depths alongside the piers were as follows:—

Government pier .	197 feet ($60^{m}0$): depth 20 feet ($6^{m}1$).
Piers I and II . .	984 feet ($300^{m}0$): depth 36 feet ($11^{m}0$).
Pier III . . .	394 feet ($120^{m}0$): depth 38 feet ($11^{m}6$).
Pier IV . . .	164 feet ($50^{m}0$) long.
Pier V . . .	164 feet ($50^{m}0$) long: depth 38 feet ($11^{m}6$).
Pier VI . . .	459 feet ($139^{m}8$) long.
Pier VII . . .	Under construction northward of pier VI.

The Government pier is a pontoon pier, used by small vessels and the pilot boats.

Piers I and II are used for general cargo and coaling; they can also be used as an oil pier.

Piers III, IV and V are oiling piers.

Pier VI is for general cargo and coaling.

Line 37: *For* " letter " *read* " number "

Line 38: *After* " roadstead " *insert* " ; vessels lie here sheltered under all conditions of wind and sea "

Page 400 continued.

Lines 39-47: *Delete* and *substitute*:—

Shoal.—Buoys.—Beacon.—A shoal, with a depth of 18 feet ($5^{m}5$) over it, half a cable south-westward of which there is a black mooring buoy, lies about 11½ cables north-north-eastward of Tokong light-structure. A shoal area, which forms an inner bar, exists north-north-westward of this shoal in the approach to Pier No. VI; in August, 1949, the least depth in this area, which must be crossed by vessels berthing at Piers Nos. V and VI on the flood stream, was 20 feet ($6^{m}1$).

A black mooring buoy lies about 5 cables northward of Pier No. VI.

Page 401.—Lines 3-4: *Delete* and *substitute*:—

" can buoy, moored about 5 cables west-south-westward of the white beacon, and a black beacon, situated about 1½ miles north-north westward of Tanjong Makasar, mark the western side of "

Line 6: *After* " **Directions.**—" *insert*:—Should a vessel's draught exceed 23 feet ($7^{m}0$), the fact should be stated in the Time of Arrival signal.

Line 7: *After* " buoy," *insert* " No. 1,"

Line 8: *Delete* " eastward " to " light-buoy " and *substitute* " fully half a mile eastward of it; thence she should steer northward until the outer light-buoy, No. 2,"

Lines 10-13: *Delete* " 268° " to " 321° " and *substitute* " between the black and the white buoys "

Line 15: *For* " buoy " *read* " light-buoy "

Line 38: *For* " ; water " *read* " in very limited quantities; drinking water is obtainable in cases of necessity up to a maximum of 25 tons and "

Lines 46-47; *Delete.*

Page 402.—Line 17: *After* " **KOETEI.**—" *insert* " **Outlying banks.**—

Lines 32-33: *Delete* " A " to " lies " and *substitute* " Small banks, with depths of 12 and 11 fathoms ($21^{m}9$ and $20^{m}1$) over them, lie inside the 100-fathom ($182^{m}9$) line about 15 and "

Line 35: *Delete* and *substitute*:—

" and there are depths of from 14 to 17 fathoms ($25^{m}6$ to $31^{m}1$) within a distance of about 10 miles south-westward and east-south-eastward of the 12-fathom ($21^{m}9$) bank; the positions of these can best be seen on the chart. [A bank, with a depth of 9¼ fathoms ($16^{m}9$), and with depths of 16 and 19 fathoms ($29^{m}3$) and ($34^{m}7$) about 1¾ miles south-eastward and 2½ miles north-eastward of it, lies about 16½ miles south-eastward of Tanjong Pelai."]

Lines 51-53: *Delete* and *substitute*:—

" **Light-buoy.**—A conical light-buoy, painted in red and [white vertical stripes] and exhibiting a *white flashing* light showing a flash of *three seconds* duration *every twelve seconds*, is moored about 8 miles south-south-eastward "

Page 403.—Line 8: *For* " 8½ feet ($2^{m}6$) " *read* 7½ feet ($2^{m}3$) in 1952

Line 45: *Delete* " **Beacon.**—"

Page 404.—Lines 22-24: *Delete.*

Line 37: *For* " **gauge** " *read* " **gauges** "

Page 404 continued.

Line 39: *After* " bar " *insert* " , which is composed of hard sand,"

Line 41: *For* " in red and black bands," *read* " white and "

Line 44: *For* " Dutch feet (11·8 inches) " *read* " decimeters "

Line 46: *For* " ball " *read* " black truncated cone "

Line 48: *For* " 1948 " *read* " 1951."

Lines 49-54: *Delete* and *substitute*:—

" 7 inches too much.

Another tide gauge is attached to a black cone beacon standing about 6 cables eastward of the beacon just mentioned.

[A similar tide gauge, giving the depth on the outer bar, is situated on the western side of the channel about 4¼ miles north-westward of Tanjong Pegah.]

A beacon stands about 3 cables north-north-westward of the first tide gauge beacon.

A light-buoy, painted white and exhibiting a *white flashing* light of *one second* duration *every eight seconds*, is moored about 4 miles south-south-westward of Tanjong Pegah.

A light-buoy, painted white and exhibiting a *white flashing* light *every sixteen seconds*, is moored about 4½ miles south-south-westward of Tanjong Pegah."

Page 405.—Lines 2-6: *Delete* and *substitute*:—

" beacon.

A light-buoy, painted black and exhibiting a *white flashing* light *every five seconds*, is moored nearly 2½ miles west-south-westward of Tanjong Pegah,

Another tide-gauge, graduated in decimeters and giving the depth in the shoalest part of the channel through the outer bar, stands on the south-eastern side of Boekoean, about 7¾ miles northward of the black tide-gauge beacon; in 1951, it was reported to register about 1½ feet ($0^{m}5$) too high."

Line 13: *Delete* and *substitute*:—

" in-going stream sets north-westward and the outgoing stream south-eastward."

Line 16: *Add*:—There is a pair of leading lights, which are in line bearing about 121°, on the eastern bank opposite the entrance to Sungei Sanga Sanga; a light is exhibited on the western side of the channel about three-quarters of a mile north-westward of the front leading light.

Line 19: *For* " buoy " *read* " light-buoy "

Line 22: *Delete* and *substitute*:—

A vessel bound for Samarinda through Muara Pegah should steer north on the inner white light-buoy, so as to pass between the outer white light-buoy and the eastern black cone reflector beacon, thence she should pass close westward of the inner white light-buoy; regard should be paid to the tidal streams which, especially on the bar, frequently set across the channel. Further directions are not given as pilotage is compulsory, *see* page 403.

Line 26: *Delete* " **Beacon.—Buoy.**—"

Lines 28-29: *Delete* " and " to " beacon,"

Lines 42-43, 50: *Delete* " the beacon on "

Lines 46-47: *Delete.*

Lines 51-54: *Delete* " The beacon " to " thence " and *substitute* " Vessels should pass "

Page 406.—Line 16: *Delete* " the white conical buoy marking "
Line 30: *After* " **Bajor.**—" *insert* " **Beacon.**—"
Line 38: *Add*:—A beacon, fitted with a reflector, stands on the south-western side of the channel about one mile westward of the western extremity of Noebi.

Page 407.—Lines 5-12: *Delete.*
Lines 26-27: *Delete* " stands on " to " feet " and *substitute* " stands "
Line 32: *Delete* and *substitute*:—
" this village; both gauges are marked in Dutch feet (11·8 inches)."
Lines 41-42: *Delete* " and thence " to " ($3^{m}0$) "

Page 408.—Lines 2-5: *Delete* " ; when " to " Klamboe "
Line 9: *Delete* " marks " to " reflectors " and *substitute* " beacons "
Line 11: *For* " 120° " *read* " 121½° "
After line 32 *insert*:—
A shoal, with a depth of 1¼ fathoms ($2^{m}3$) over it lies in the northern approach to Muara Berau about 14 miles north-north-eastward of Pulau Leroeng.

Page 409.—Line 14: *After* " **anchorages.**— " *insert* " **Beacons.**— "
Line 15: *After* " areas " *insert* " marked by beacons and "
Line 16: *Delete* and *substitute*:—
" chart about half a mile eastward, half a mile southward and 1½ miles "
Line 48: *After* " **Dangers.**—" *insert* " **Notice boards.**—
Lines 50-51: *Delete* " meridian " to " Koetei " and *substitute* " meridians of Notice Boards on the left bank of the river in about long. 117° 06·3′ E. and 117° 09·7′ E.; each notice board bears the inscription *Batas Pelabuhan* "

Page 410.—Line 36: *Delete* " one " to " alongside " and *substitute* " one foot to 7 feet ($0^{m}3$ to $2^{m}1$) alongside, in December 1952, and from 7 to 15 feet ($2^{m}1$ to $4^{m}6$) at a distance off of about 16 feet ($4^{m}9$)."
Line 37: *After* " with " *insert* " in 1951,"
Lines 38: *For* " has " *read* " had, in 1951,"

Page 411.—Line 3: *Add*:—Samarinda is connected by telephone with Balik Papan and Tenggarong and is in radio communication with Makasser, Banjermasin, Balik Papan and Tarakan.
Line 4: *Add*:—The tide-gauge indicates 145 centimetres (4·7 feet) at mean tide level. There are two Government slipways with capacities of 100 and 150 tons, and five smaller private slips.
Line 6: *After* " **Light.**—" *insert* " **Beacons.**—"
Line 13: *For* " 7 feet ($2^{m}1$) " *read* " 3 feet ($0^{m}9$) "
Line 24: *Delete* and *substitute*:—
" places of the cable on both banks are each marked by white boards "
Line 33: *After* " Berhala." *insert*:—Beacons stand on the eastern bank south-eastward of Tanjong Berhala.
Line 40: *After* " long." *insert*:—There are two slipways here of 50 and 300 tons capacity.

Page 412.—Line 11: *After* " ($79^{m}9$) " *insert* " , and a draught of about 16 feet ($4^{m}9$),"

Line 12: *After* " Boekit " *insert* " ; at Loa Tebo there are two piers with a depth of 13 feet ($4^{m}0$) alongside, but in 1951 their condition was reported to be bad "

Line 14: *For* " is a pier " *read* " are two piers with a depth alongside, in 1951, of 20 feet ($6^{m}1$) "

Lines 37-38: *Delete.*

After line 45 *insert*:—

Telok Lombok.—Anchorage.—Telok Lombok, an inlet about 2 miles westward of Tanjong Sangatta, has a channel suitable for vessels of draught up to 10 feet ($3^{m}0$); the channel is not marked and there are numerous coral reefs in its vicinity which are only very slightly indicated by discoloration. Strong tidal streams may be experienced in the inlet at the time of spring tides; these only follow the channels at low water, and at high water flow over the reefs.

Two drying reefs lie close to the coast about 2½ miles south-westward of Tanjong Sangatta. An approach channel to Telok Lombok has been swept and leads westward from the 10-fathom ($18^{m}3$) line, passing northward of the northern of these two reefs and southward of a reef with a depth of 6 feet ($1^{m}8$) over it, to a swept anchorage which lies between the coast and the northern reef. There is a least depth of 26 feet ($7^{m}9$) in the approach channel, and of 23 feet ($7^{m}0$) in the swept anchorage; the tidal streams at the anchorage set more southerly than north-easterly, and the rate does not exceed one knot.

Vessels approaching from eastward can plainly discern the northern shore of Telok Lombok when in the vicinity of Sangatta reef (page 414).

Line 46: *For* " About " *read* " **Coast.**—About "

Page 413.—*After* line 6 *insert*:—

Chart 3031, plan of Sangkulirang bay.

Line 9: *For* " 3 feet ($0^{m}9$) " *read* " one fathom ($1^{m}8$) "

After line 10 *insert*:—

Chart 2636.

Page 414.—Line 8: *Delete* " **Beacon.**—"

Lines 20-21: *Delete* " it is " to " triangle; "

Line 24: *For* " 4 fathoms ($7^{m}3$) " *read* " one fathom ($1^{m}8$) "

Line 25: *For* " 2¼ " *read* " 1¼ "

Line 26: *Add*:—A reef, with a depth of 2¾ fathoms ($5^{m}0$) over it, and a depth of 8 fathoms ($14^{m}6$) lie, respectively, about 1½ miles north-north-westward and one mile west-south-westward of Sangatta reef.

A 5-foot ($1^{m}5$) patch lies about 10 miles northward of Sangatta reef.

A 1½-fathom ($2^{m}7$) patch, with depths of 3½ and 9 fathoms ($6^{m}4$ and $16^{m}5$) close south-westward and southward of it, respectively, lies about 7½ miles south-westward of Sangatta reef.

Page 415.—Line 15: *For* " staff and framework " *read* " ball "

[**Views facing page 416.**—Bottom view, top section: *For* "*Tjinaloe*", "*Batoe Djawia*" and "*Boeloe Pinka*" *read*, respectively, "*Chinalu*", "*Batu Jawia*" and "*Pingka*" and *for* "*Liboekang*" and "*Siboekang*" *read* "*Libukang*" and "*Sirukang*"]

[Lower section: *For* "*Soeka*", "*Bojong Tjinnong*" and "*Ujong Batoe*" *read* "*Sukang*", "*Bojong Chinnong*" and "*Ujong Batu*"]

[**Views facing page 417.**—Top view, top section: *For* "*Karampoeang village*", "*Laboe Tjinri*" and "*Tjinaloe*" *read*, respectively, "*Karampuang village*", "*Labuchinri*" and "*Chinalu*"]

[Lower section: *For* "*Soeka*" *read* "*Sukang*"; and *for* "*Batoe Djawia*" *read* "*Batu Jawia*"]

[Bottom view, bottom section: *For* "*Tjinaloe*", "*Batoe Djawia*", "*Soeka*", "*Karampoeang*" and "*Siboekang*" *read* "*Chinalu*", "*Batu Jawia*", "*Sukang*", "*Karampuang*" and "*Sirukang*"]

Page 418.—*After* line 28 *insert*:—

A shoal, with a depth of 4¾ fathoms ($8^{m}7$) over it, lies on the bank about 8½ miles south-westward of the southern extremity of Doang Doangan besar; another shoal, with a depth of 6 fathoms ($11^{m}0$) over it, lies 4 miles south-westward of this shoal.

A shoal, with a depth of 7½ fathoms ($13^{m}7$) over it, lies on the southern part of the bank about 18½ miles south-westward of the southern extremity of Doang Doangan besar.

Lines 35-36: *Delete* " clear " to " it is "

After line 38 *insert*:—

Eric bank, named after the S.S. *Ericbank* which first reported it, in 1950, lies in the centre of Middle channel, about midway between the south-eastern extremity of the bank on which lie Doang Doangan eilanden and the southern extremity of Laars banks. This bank, which has not been closely examined, is about 10 miles in length in a north-easterly and south-westerly direction, and has depths of 10 and 44 fathoms ($18^{m}3$ and $80^{m}5$), hard coral, over its southern and northern extremity, respectively.

A shoal, the position of which is approximate, with a depth of 12 fathoms ($21^{m}9$) over it, was reported in 1950 to lie about 19 miles westward of the southern extremity of Eric bank.

Line 51:

[Lines 51-52: *Delete* " bank " to " , and " and *substitute* " shoal, with a depth of 11 fathoms ($20^{m}1$) over it, lies about 2½ miles southward of Pisani bank, and] another shoal with a similar depth over it was reported, in 1950, to lie about 2 miles west-north-westward of it; "

Page 419.—Lines 20-22: *Delete* " and " to " down " and *substitute* " the front beacon being surmounted by a cone point up "

[Lines 49-50: *For* " a white octagonal tower " *read* " an octagonal tower, painted in red and white horizontal bands,"]

[**Page 420.**—Line 29: *For* " 3,754 feet ($1,144^{m}3$) " *read* " 3,757 feet ($1,145^{m}2$) "]

[Line 33: *For* " 2,992 feet ($912^{m}0$) " *read* " 2,995 feet ($912^{m}9$) "]

Page 420 continued.

[Line 34: *After* " Dongolo," *insert* " the latter 2,011 feet ($613^{m}0$) high,"]

[Line 36: *After* " (Chinalu)," *insert* " 984 feet ($299^{m}9$) high,"]

[Line 38: *After* " (Bulu Pingka)," *insert* "2,018 feet ($615^{m}1$) high,"]

[Line 41: *After* " (Batu Jawia)," insert " 1,148 feet ($349^{m}9$) high,"]

[Line 43: *After* " (Sirukang)," *insert* " 669 feet ($203^{m}9$) high,"]

[Line 45: *After* " (Sukang)," *insert* " 1,001 feet ($305^{m}1$) high,"]

[**Page 421.**—Line 5: *Delete* " steep-to "]

[*After* line 49 *insert*:—

Danger.—A shoal, with depths of 4 and 5 fathoms ($7^{m}3$ and $9^{m}1$) over it, lies nearly 2 miles southward of Ujong Barojaja and nearly 1½ miles offshore.]

Page 424.—Line 39-41: *Delete* and *substitute*:—

" A light-buoy, ——— painted [in black and white vertical stripes] fitted with a radar reflector and exhibiting a *white flashing* light showing a flash of *three seconds* duration *every nine seconds,* is moored at the entrance to the channel about 3 miles north-westward of the southern extremity of Bone "

[Lines 43-44: *Delete* " A white " to " ball " and *substitute*:— " A conical buoy, No. 1, painted in black and white chequers "]

Line 46: *Delete* " painted " to " bands," and *substitute* " [No.2], painted [red], fitted with a radar reflector and "

Line 49: *Delete* [" A white "] to " mile " and *substitute*:—[" A conical buoy, No. 3, painted in black and yellow chequers,] is moored about 7 cables "

Lines 53-54: *Delete* " painted " to " *sixteen* " and *substitute* " No. 5, painted [black] and exhibiting a *white flashing* light showing a *short* flash *every three* "

Page 425.—Line 4: [*Delete* " A black " to " cone " and *substitute*:— " A can buoy, No. 4, painted in red and white chequers and surmounted by a red truncated cone "]

Line 5: *For* " 5 cables southward " *read* " 5½ cables south-westward "

Lines 11-12: *Delete* and *substitute*:—

" A conical light-buoy, No. 7, painted [in black and white chequers] and exhibiting a *white flashing* light showing a *short* flash *every five seconds,* is moored about 3½ cables north-north-westward of Samalona "

Lines 14-15: *Delete* [" A white "] to " south- " and *substitute*:— [A conical buoy, No. 9, painted in black and white chequers and surmounted by a black diamond,] is moored about 3½ cables "

[Line 42: *For* " black " *read* " in black and white chequers "]

[Line 46: *Add*:—Two black unlighted light-buoys are moored about 1¾ cables south-westward of Hoofd rif.]

[Lines 47-50: *Delete* and *substitute*:—

A beacon, surmounted by a ball, and painted in black and white horizontal bands, from which a light is occasionally exhibited, stands on the northern edge and a beacon painted in black and white horizontal bands surmounted by a similarly coloured ball under a black cone stands on the eastern edge of Klein Lae Lae reef.]

Page 426.—Line 2: *Delete* " 9 " to " (20^{m}1) " and *substitute* " 7 to 9 fathoms (12^{m}8 to 16^{m}5) "

[Lines 3-4: *Delete* " A black " to " cone " and *substitute*:—" A beacon, painted in red and white horizontal bands, surmounted by a similarly coloured ball below a red truncated cone, from which a light is occasionally exhibited,"]

[Line 8: *For* " black " *read* " red "]

[Line 10: *Delete* " A black " to " cone " and *substitute*:—

" A beacon, painted in red and white horizontal bands, surmounted by a similarly coloured ball below a red truncated cone "]

After line 15 *insert*:—

[Red] spherical buoys are moored about half a cable south-eastward and 2½ cables southward of the drying part of Gosong Panjoa.

Page 427.—Line 8: *Delete* " **Light** " to " pier," and *substitute* " **Lights.**—The Naval pier, 49 feet (14^{m}9) in length,"

Line 11: *For* " 11 feet (3^{m}4) " *read* " 13 feet (4^{m}0) "

Lines 13, 18: *For* " Wilhelmina wharf " *read* " Djembatan Hatta "

Lines 14-15: *Delete* " 1948 " to " (6^{m}3) " and *substitute* " 1952, had a least depth of 29 feet (8^{m}8) "

Lines 18, 22, 27, 31, 38-39: *For* " Juliana quay " *read* " Pangkalan Sukarno "

Lines 19-20: *For* " 24½ feet (7^{m}5) " *read* " 32 feet (9^{m}8)

Lines 25-26: *Delete* " about " to " (8^{m}4) " and *substitute* " 197 feet (60^{m}0) long, with a depth of 28½ feet (8^{m}7) "

Line 28: *For* " Prins Hendrik quay " *read* " Pangkalan Sultan Hasannudin "

[Line 29: *Delete* and *substitute*:—

" depth of 26 feet (7^{m}9) alongside. A wooden pier, 39 feet (11^{m}9) long, with a dolphin on each side of its head forming a berth, 144 feet (43^{m}9) in length, in a depth of 26 feet (7^{m}9), lies about 1¼ cables eastward of Ujong Tanah, situated about half a mile eastward of Gosong Boni."]

After line 30 *insert*:—

A light is exhibited at the look-out tower of the Harbour office.

Lines 41-42: *Delete* " three " to " Pandan." and *substitute* " the centre of Pangkalan Sukarno.

The light at Mariso village, nearly 1½ miles south-south-eastward of Tanjong Pandan, is referred to on page 424."

After line 52 *insert*:—

Regulations.—Vessels awaiting pilotage must anchor in the roadstead. Embarkation or dis-embarkation of personnel, and loading or unloading of cargo, in the roadstead is prohibited.

Page 428.—Lines 3-5: *Delete* " Fort " to " side."

Lines 9-11: *Delete* " Large " to " hour." and *substitute*:—

On Pangkalan Sukarno, a stock of 3,000 tons of coal is maintained for the use of vessels of the K.P.M. line; it is loaded by a steam-driven crane. In urgent cases coal will be supplied to other vessels.

Page 433.—Line 47: *Delete* " 3¼ " to " close " and *substitute* " 3 fathoms (5^{m}5), about 3½ miles "

Line 48: *After* " Makasser " *insert* "; there is a depth of 3¼ fathoms (5^{m}9) about 1½ miles northward of the narrows of Banko Bankoang "

Page 434.—Line 30: *After* " noticeable." *insert* " Keri Keri or "
Line 32: *After* " peak " *insert* " , 2,522 feet ($768^{m}7$) high "
Line 33: *After* " archipel." *insert* " Alipang or "
Line 34: *Delete* " four " to " together " and *substitute* " a bare rocky summit with four small peaks close together, 1,095 feet ($333^{m}8$) high "
After line 37 *insert*:—
Langalo, with two peaks rising to 2,850 feet ($868^{m}7$), lies about 4 miles north-eastward of Alipang.

Page 435.—Line 14: *For* " 5 feet ($1^{m}5$) " *read* " 2 fathoms ($3^{m}7$) "
[Line 15: *After* " ball " *insert* " ; in 1953, the ball topmark had disappeared "]
Line 18: *After* " ward of " *insert* " Labutung or "
[Line 23: *After* " edge " *insert* " ; in 1953, the ball had disappeared"]
[Line 53: *After* " trees." *insert*:—A mosque stands on the summit of Salemo.]

Page 439.—Line 38: *For* " Djonga (Jonga) " *read* " Djontjongang or Djonga "
Line 40: *After* " (Bulu) " *insert* " , 202 feet ($61^{m}6$) high "
Line 42: *After* " **Dangers.**—" *insert* " **Light-buoy.**—"

Page 440.—[Line 3: *For* " 4 " *read* " 3 "]
[Lines 4-5: *Delete* " ; it " to " chart " and *substitute* " and about three-quarters of a mile south-westward from the coast three-quarters of a mile north-westward of that point "]
[Lines 12-13: *Delete* " In 1946 " to " southward."]
[Line 15: *For* " south-eastern " *read* " north-eastern "]
After line 16 *insert*:—
A white can light-buoy, from which a *green fixed* light will be exhibited on request, is moored about half a cable west-north-westward of the white beacon marking Laoebang.
[*After* line 27 *insert*:—
There is a jetty in the south-eastern part of Soepa baai, about half a mile eastward of the point at the northern end of the village; the edge of the coastal bank here is marked by can buoys.]
[Line 35: *After* " Tete " *insert* " , but taking care to avoid the south-eastern edge of Tete "]
[Line 38: *For* " Djonga " *read* " Djontjongang "]

[**Page 441.**—Line 36: *After* " cone " *insert* " ; in 1953, the beacon had disappeared "]

Page 449.—Line 11: *Delete* " beacon " to " up," and *substitute* " post "
Line 15: *After* " beacon " *insert* " , surmounted by a white triangle point up "
Lines 17-18: *Delete* " black " to " ($3^{m}0$)." and *substitute* " white triangle point down, at an elevation of 10 feet ($3^{m}0$). The lights of the light-beacons are exhibited on request only."

Page 452.—Line 54: *Add*:—A shoal, with a depth of 8 fathoms ($14^{m}6$) over it, lies about one mile northward of Pasie Bangilongan.

Page 454.—Line 43: *Delete* " **Buoy.**—"

Page 455.—*After* line 6 *insert*:—

A shoal, with a depth of 27 feet (8^{m}2) over it, exists about 1½ miles south-south-westward of the southern extremity of Lingian; the shoal is not marked by discoloration.

Lines 27-29: *Delete* " white " to " which " and *substitute* " reef "

Page 464.—Line 32: *Add*:—A reef which dries, the position of which is approximate, was reported, in 1953, about 3 miles east-south-eastward of the beacon on the eastern extremity of Karang Besar.

Page 465.—Line 7: *Delete* " surmounted " to " cylinder " and *substitute* " without a topmark "

[**Page 467.**—*After* line 33 *insert*:—

A bank, with a depth over it of 10 fathoms (18^{m}3), coral, lies about 4 miles south-south-eastward of Sangalakki light-structure.]

[**Page 470.**—Line 20: *Delete* and *substitute*:—

" A conical buoy, painted in black and white vertical stripes and surmounted by a black diamond, is "]

[Line 23: *Delete* " A white " to " ball " and *substitute*:—

" A black conical buoy, surmounted by a black diamond "]

[Line 35: *After* " **Beacons.**—" *insert* " **Light.**—"]

[Lines 38, 39: *For* " buoy " *read* " light-buoy "]

[Line 40: *For* " black " *read* " white "]

[Line 41: *For* " surmounted by a ball " *read* " exhibits a *white flashing* light of *four seconds* duration *every twelve seconds* "]

[Lines 43-47: *Delete* and *substitute*:—

A light-buoy, painted red and exhibiting a *red flashing* light *every five seconds*, is moored on the southern side of the channel about 6 miles eastward of the eastern extremity of Goentoeng; the northern side of the channel is marked by a conical buoy, painted black and surmounted by a white diamond fitted with a *white* reflector, and by a similar buoy, painted in black and white chequers and surmounted by a black diamond, moored respectively, about 9½ and 3 miles eastward of the same point.

A light is exhibited from a white beacon situated on the eastern extremity of Goentoeng.]

[**Page 471.**—Line 14: *After* " Baroe " *insert* " ; a number of the beacons are fitted with reflectors, *green* or *white* on the starboard, *red* or *white* on the port side of the channel; *see* page 9.]

[Line 16: *For* " black mooring buoy " *read* " red light-buoy "]

[Line 23: *Delete* " and giving " to " channel "]

[Line 25: *Delete* " it was " to disappeared " and *substitute* " the level of 10 feet (3^{m}0) on the gauge corresponds to the datum of the chart of the locality "]

[Line 27: *For* " favourite " *read* " favourable "]

Page 474.—*After* line 19 *insert*:—

In 1949, the least depth at mean water level on the alignment of

Page 474 continued.
the leading beacons at Steile hoek, in the southern entrance to Sungei Temenggah, was 8½ feet (2^{m}6).

Page 475.—Lines 7-10: *Delete* " A tide-gauge " to " hoek."
Line 39: *Add*:—In 1949, the pier was in a bad state of repair.

Page 476.—Line 2: *For* " the outer buoys " *read* " Tarakan light-vessel (page 477) "
Lines 19-21: *Delete* " the light- " to " -eastward " and *substitute* " Tarakan light-vessel, moored about 14 miles eastward "
Line 47: *For* " 600 tons per hour " *read* " 200 tons per hour at the southern pier and 600 tons per hour at the northern pier "
Line 49: *For* " of 21 feet (6^{m}4) " *read* " , in 1952, of 24 feet (7^{m}3) "
Line 50: *Delete* " 50 " to " (11^{m}3) " and *substitute* " 164 feet (50^{m}0) long, with a least depth, in 1952, of 32 feet (9^{m}8)

Page 477.—Lines 3-6: *Delete* " 23 " to " (20^{m}1)." and *substitute* " 22 feet (6^{m}7) can berth alongside the southern oiling pier which is also the Commercial pier. In 1949, the northern oiling pier was stated to be in a weak condition and vessels could not berth there in strong onshore winds.
The usual anchorage is off the southern oiling pier, westward of the two light-buoys moored off that pier, in depths of from 39 to 42 feet (11^{m}9 to 12^{m}8) "
Line 12: ——————————————
[Line 14: *Add*: The look-out tower was destroyed, in 1954.]
Line 15-16: *Delete* " Provisions " to " quantities."
Line 17: *After* " obtained " *insert* " at certain times of the year "
Lines 18-19: *Delete* " A " to " settlement." and *substitute*:—
There is a Government hospital and a hospital owned by the oil company; there is a doctor at each.
Line 22: *For* " 2 miles " *read* " one mile "
After line 23 *insert*:—
Anchorage signal.—A black ball, displayed [on shore], indicates that a vessel must anchor.
Line 24: *After* " **channel.**—" *insert* " **Light-vessel.**—"
After line 24 *insert*:—
A light-vessel, painted black with " Tarakan " in white letters on her sides, from which a light is exhibited at an elevation of 65 feet (19^{m}8), is moored about 14½ miles eastward of Tanjong Batoe.
[Line 27: *For* " a white iron beacon " *read* " an iron beacon painted in red and white vertical stripes "]
Line 31: *For* " light-buoy " *read* " light-vessel "
Lines 38-[40]: *Delete.*
[Line 42: *For* " 8 miles eastward " *read* " 4 miles east-south-eastward "]
Line 47: *For* [" white iron beacon " *read* " beacon painted in black and white vertical stripes ']
After line 49 *insert*:—
[A black beacon surmounted by two black cones stands on the southern edge of Menoeloen reef.]

[Line 53: *For* " black " *read* " red "]

Page 478.—[Line 2: *For* " southward " and " black " *read* " southward of the site " and " in red and white chequers "]

[Lines 5-6: *Delete* and *substitute*:—
" southward of the site of the look-out tower.]

Line 7: *After* " vessels " *insert* " ; pilots are obtainable from the light-vessel "

[Line 9: *For* " outer light-buoy " *read* " light-vessel "]

Line 10: *After* " Linkas " *insert* " ; masters should include the draught of their vessels in their request for pilotage "

Line 13: [*For* " **Buoys.**—" *read* " **Swept channel.—Light.—Beacons.—Buoyage.—]Flare.**—"

Line 17: *After* " uninhabited." *insert*:—

A conspicuous oil flare is situated about [one mile northward] of the southern extremity of the island.

Lines 21-22: *Delete* " , and " to " westward "

Lines 24-26: *Delete* [and *substitute*:—

A light is exhibited, at an elevation of 56 feet (17^{m}1), from a white iron framework tower, 61 feet (18^{m}6) in height, situated on Tanjong Arang.

A light-buoy, painted red and exhibiting a *white flashing* light *every twelve seconds*, is moored about 7 miles south-eastward of Tanjong Arang and 1½ miles eastward of Johanna reef, *see* below.

A channel about 4 cables wide has been swept by wire drag, to a depth of 36 feet (11^{m}0), between the entrance and the anchorage; from a position on the centre line 109½°, distant 7 miles from the light-structure on Tanjong Arang, the channel runs in a 270° direction for a distance of 4 miles and thence in a 284° direction for about 4¾ miles.]

Line 29: *For* " barrel buoy." *read* " conical buoy [, No. 1, painted in black and white chequers, surmounted by a black cone and fitted with a *green* reflector]; a rock, with a depth of less than 6 feet (1^{m}8) over it, lies on this bank about three-quarters of a mile southward of the point.

[A 4¼-fathom (7^{m}8) patch lies about 1½ miles west-south-westward of Tanjong Arang; it is marked on its southern side by a conical buoy, No. 3, painted in black and yellow chequers; a red can buoy, No. 6, is moored about 3 cables southward of the patch.]

A white conical buoy, surmounted by a truncated cone, lies 4 cables south-westward of a rock awash situated 3¼ miles west-north-westward of Tanjong Arang.

[Line 32: *For* " , and " *read* " ; it is marked on its north-western side by a beacon surmounted by two black cones, points up, but "]

[Line 36: *For* " , and " *read* " ; it is marked near its western end by a beacon surmounted by two red cylinders; it "]

Lines 38-39: *Delete* " A " to [" point. and *substitute*:—A 4-fathom (7^{m}3) patch, marked by a red can buoy, No. 2, surmounted by a red cylinder, with a 4¼-fathom (7^{m}8) patch 3 miles westward of it, lies on the southern side of the channel about 4½ miles south-eastward of Tanjong Arang. A 5¾-fathom (10^{m}5) patch, marked by a red can buoy, No. 4, surmounted by a red cylinder and fitted with a *red* reflector, lies near the southern edge of the swept channel about 3 miles south-south-eastward of Tanjong Arang.]

Lines 41-42: *Delete* " one " to " Boenjoe " and *substitute* " 1¾ miles west-south-westward of Tanjong Arang, but care must be taken to avoid the 4¼-fathom (7^{m}8) patch northward of this position "

Page 478 continued.

Lines 44-45: *Delete* " the southern " to " [103°.] " and *substitute* " Tanjong Arang bearing [103°.]

[A submerged oil pipe line, indicated on the chart, extends about 1¼ miles southward and thence half a cable south-westward from the southern end of Boenjoe; a red drum is moored near the elbow in the pipe line and a mark buoy lies about 1¼ cables west-north-westward of it. Two mooring buoys are laid nearly one cable south-eastward of the end of the pipe."]

[**Page 479.**—Line 5: *For* " southward of the white buoy " *read* " northward of red can buoys, Nos. 2 and 4 and southward of black and white conical buoy, No. 1,"]

Page 483.—Line 54: *For* "a depth of 24" *read* "depths of 15 and 24"

Page 484.—Line 2: *Delete* " ($43^{m}9$) " to " 1947 " and *substitute* " ($27^{m}4$ and $43^{m}9$) over it, was reported, in 1947 and 1952 "

Page 496.—Line 21: *For* " the easternmost danger " *read* " one of the easternmost dangers "

After line 23 *insert*:—

A rocky shoal with a depth of 3¾ fathoms ($6^{m}9$) over it was reported, in 1950, to exist about 3 miles south-eastward of Karang Limpogeh; its chartered position is approximate.

Page 500.—Line 17: *Delete* " surmounted by a cone,"

Page 504.—[Line 5: *After* " sea." *insert*:—An obstruction was reported, in 1954, to lie about 5 miles north-eastward of Tanjong Boea.]

Line 22: *After* " doctor " *insert* " and a hospital is available "

Lines 23-26: *Delete* and *substitute*:—

A stone breakwater extends east-north-eastward from the shore, near the mouth of the river, for a distance of about 9 cables; close to the breakwater there is a small pier with steps.

Lines 31-32: *Delete* " At " to " pier."

Page 508.—*After* line 6 *insert*:—

A dangerous reef lies about one mile south-eastward of Bingkoka.

Page 514.—*After* line 41 *insert*:—

A large village exists on the northern shore of Groot Tobea; a stone landing pier extends north-north-eastward for over one cable from the coast in the vicinity of the village.

Page 515.—Line 48: *Delete* " surmounted by a cone "

[**Page 516.**—Lines 4-5: *Delete* " , surmounted " to " cone,"]

Page 519.—Line 38: *Add*:—There is an aircraft mooring buoy about 3½ cables east-north-eastward of this pier.

Page 520.—*After* line 52 *insert*:—

A pinnacle rock, with a depth of 5½ fathoms ($10^{m}1$) over it, lies in

Google

Page 520 continued.

mid-channel about 7 cables north-westward of Leboetan, nearly midway between that island and Bali rif.

[**Page 531.**—Line 1: *Delete* and *substitute*:—
Charts 3148, 2196.]
[Line 23: *Delete* " (High rock) "]

[**Page 532.**—Line 1: *Delete* and *substitute*:—
Charts 3148, 2196.]
[Line 2: *Delete* " (Two Brothers) "]
[Line 17: *Delete* " (Champada) ", in two places.]
[Line 28: *Delete* " (North reef) "]
[Line 33: *Delete* and *substitute*:—
Chart 3148.]
[Line 40: *Delete* " (East) "]

[**Page 533.**—Line 1: *Delete* and *substitute*:—
Chart 3148.]
[Line 4: *Delete* " (Middle) "]
[*After* line 14 *insert*:—
Charts 3148, 2196.]
[*After* line 25 *insert*:—
Chart 3148.]
[Line 38: *Delete* and *substitute*:—
Charts 3148, 2196.]
[Line 51: *Delete* and *substitute*:—
Chart 3148.]

Page 534.—[Line 1: *Delete* and *substitute*:—
Chart 3148.]
[Line 11: *Delete.*]
Lines [35]-39: *Delete.*

[**Page 535.**—Line 1: *Delete* and *substitute*:—
Chart 3148.]
[Line 2: *Delete* " (Jambi) "]
[Line 4: *Delete* " (North channel) " and " (South channel) "]
[Line 42: *Delete* " (Chabi) "]

Page 536.[—Line 1: *Delete* and *substitute*:—
Chart 3148.]
Line 11: *Delete* " , taking " to " vicinity,"
[Line 43: *Delete.*]
Lines 45-46: *For* "Tampakoera (Tampoauluna)" *read* "Tampakura"
Line 53: *For* " 869 feet (264^{m}9) " *read* 867 feet (264^{m}3) "

Page 537—Line 3: *For* " 2,228 feet (679^{m}1) " *read* " 2,225 feet (678^{m}2) "
Line 4: *For* " 2,796 feet (852^{m}2) " *read* " 2,137 feet (651^{m}3) "
Line 49: *For* " South reef " *read* " Zuidrif "
After line 52 *insert*:—
Nordrif, with a depth of 10 feet (3^{m}0) over it, lies inside the 100-fathom (182^{m}9) line about 13½ miles northward of Zuidrif.
Line 53: *For* " 1,027 feet (313^{m}0) " *read* " 1,025 feet (312^{m}4) "

Page 538.—Line 5: *Delete* " Pangajarang) "
Line 11: *For* " Oeloenamboe (Ulunambu) " *read* " Ulunambu "
Line 15: *For* " Oeloenamboe " *read* Ulunambu "
Lines 26-27: *Delete* " Baboeboe " to " Sanga " and *substitute* " Bobubu, Dai Sangi "
Line 42: *For* " 2,346 feet ($715^{m}0$) " *read* " 2,343 feet ($714^{m}1$) "
Line 44: *For* " 472 feet ($143^{m}9$) " *read* " 470 feet ($143^{m}3$) "

Page 539.—Lines 4 and 16: *Delete* " (South) "
Lines 11 and 18: *Delete* " (North) "
Line 12: *For* " eastern side " *read* " south-eastern end "
Line 13: *For* " which dries " *read* " awash "
Lines 20-21: *Delete* " 2 " to " dries." and *substitute* " one foot ($0^{m}3$) over it. A rock awash and a drying reef lie about 9 cables east-south-eastward and 11 cables south-eastward, respectively, of Zuid Hindar."
Line 47: *For* " Tampakoera to Hoek " *read* " Tampakura to Huk "
Line 49: *Delete* " (Padabalé) "

Page 540.—Lines 3 and 11: *For* " Hoek " *read* " Huk "
Line 5: *For* " Tampakoera " *read* " Tampakura " and *delete* " (Baya) "
Line 13: *Delete* and *substitute*:—
" a hill, 660 feet ($210^{m}2$) high, on the southern side of Umbele,"
Lines 14-15: *For* " 282 feet ($85^{m}9$) " *read* " 260 feet $79^{m}2$) "
Line 18: *For* " Oembele " *read* " Umbele "
Line 20: *After* " entrance " *insert* " and there are numerous shoal patches in the northern approach, the positions of which can best be seen on the chart "
Line 22: *Delete* " (Sinoa) "
Line 25: *For* " Boengintindeh (Matindeh) " *read* " Bungintindeh "
Line 28: *For* " Togomolo " *read* " Togomogolo "
Lines 32-33: *For* Boenginkela " *read* " Bunginkela "
Line 36: *For* " Boeadjangka (Buajangka) " *read* " Buadjangka "
Line 41: *For* " Tampakoera " *read* " Tampakura "
[Lines 44-45: *Delete* " A white " to " Pel."]
Line 50: *For* " 3¼ fathoms ($5^{m}9$) " *read* " 2¼ fathoms ($4^{m}1$) "

Page 541.—Line 2: *For* " Boeleleh and Hoek " *read* " Buleleh and Huk "
Lines 7, 29, 37 and 50: *For* " Hoek " *read* " Huk "
Line 14: *For* " Doea " *read* " Dua "
[Line 15: *Delete* " the beacon on "]
Line 18: *For* " Tampakoera " *read* " Tampakura "
Line 22: *Delete* " (Baya) "
Line 24: *Delete* " (Togotonona) "
Line 41: *For* " Oembele " *read* " Umbele "
Line 42: *For* " Boenginkela " *read* " Bunginkela "
Line 44: *Delete* " Boenginkela " to " Hoek " and *substitute* " Bunginkela is in line with Huk "

Page 542.—Line 5: *After* " uit " *insert* " , awash,"
Line 7: *Delete* " , and partly dries "
Line 8: *Delete* " also "

Page 542 continued.

Upper view facing this page: *For* " *Tanjong Boeleleh* " *read* " *Tanjong Buleleh* "

Page 543.—Line 41: *Delete* " , surmounted by a cone "

Page 545.—Line 41: *After* " it " *insert* " ; a harbour doctor and hospital are available "

Page 549.—Line 5: *After* " **Loewoek.**—" *insert* " **Light.**—"

Line 14: *After* " tree " *insert* " ; a light is exhibited at the northern end of this village when a vessel is expected "

Page 550.—Line 37: *After* " **Peleng.**—" *insert* " **Off-lying banks.**—"

Page 551.—*After* line 3 *insert*:—

A bank, with a depth of 10 fathoms ($18^{m}3$) over it, lies about 1½ miles north-north-eastward of the western entrance point of Baai van Bolonan, described below.

Line 15: *After* " current." *insert*:—Banks, with depths of 7 and 9 fathoms ($12^{m}8$ and $16^{m}5$) over them, lie about 1¼ miles eastward and east-north-eastward, respectively, of the north-eastern extremity of North Bangkalan.

Line 21: *For* " Bonganang " *read* " Salakau "

After line 25 *insert*:—

The coastal reef in the vicinity of Salakau village extends north-westward for a distance of about half a mile offshore; a dangerous rock lies about 6½ cables offshore here, and between the rock and the edge of the reef foul ground may be expected to exist.

Page 555.—[Line 8: *Add*:—In 1953, a conspicuous hut stood on the south-western side of the reef south-eastward of Vesuvius reef.]

An uncharted shoal, the existence of which is doubtful, was reported, in 1950, to lie about 10 miles south-westward of Vesuvius.

[**Page 561.**—Line 38: *Add*:—*See* view facing this page.]

[Line 47: *After* " islets." *insert* " *See* view facing this page.]

Page 571.—Line 9: *Add*:—In 1950, the reefs on both sides of the narrow part of Straat Malingi had extended, and the use of this passage was considered most inadvisable.

Page 572.—Line 26: *After* " between." *insert*:—An islet, covered with high vegetation, situated nearly 1¼ miles north-eastward of Groot Impodi, can easily be identified, from a distance of about 6 miles outside the coastal reef, by vessels approaching from north-westward.

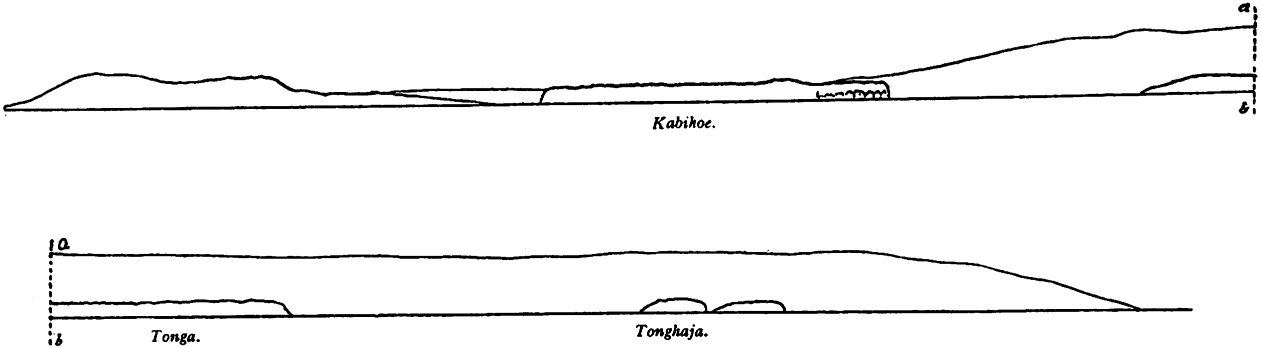
Page 575.—Line 47: *Delete* " **Light.**—"

Lines 51-52: *Delete* " , and " to " ($2^{m}4$) "

Page 576.—Line 20: *After* " beacon " *insert* " , surmounted by a white ball "

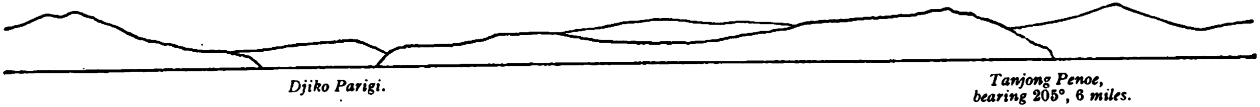
[Line 36: *Delete* " **Buoy.**— "]

To face page 561 of Book.
To face page 58 of Supplement.



View, in two parts, of northern coast of Taliaboe—Eastern extremity of Kabihoe, bearing 128°, 5 miles.

(*Original dated* 1933.)



Northern coast of Taliaboe.

(*Original dated* 1933.)

[**Page 577.**—Lines 5-6: *Delete* " , and " to " buoy "]

Page 580.—*After* line 18 *insert*:—

In 1950, a reef was reported to exist about 2¼ cables north-westward of the pier head; its charted position is approximate.

Page 583.—Lines 40-41: *Delete.*

Page 586.—Line 2: *For* " **Buoyage** " *read* " **Buoy.—Bollard** "

Lines 15-17: *Delete* " is a " to " There "

After line 18 *insert*:—

A pier, behind which is a flagstaff, is situated on the western side of the roadstead, about 4 cables north-north-westward of the light-structure; a bollard, consisting of a prominent post, used as a landfast, stands about half a cable southward of the pier.

Lines 36-37: *Delete* " north-north- " to " cable "

Line 39: *Add*:—Two mooring buoys, the southern of which is painted white, lie about one cable west-south-westward and north-westward, respectively, of the landing stage.

[**Page 590.**—Lines 19-29: *Delete* the sketch.]

[Lines 22-30: *Delete.*]

Page 599.—Line 52: *For* " 6-fathom (11^{m}0) " *read* " 3¼ fathom (5^{m}9) "

Page 603.—[Line 19: *After* " **Lembeh.**—" *insert* " **Light.**—"]

[Line 22: *For* " a small sandbank " *read* " Sandy island "]

[Line 24: *For* " the sandbank " *read* " Sandy island "]

[*After* line 28 *insert*:—

A light is exhibited, at an elevation of 53 feet (16^{m}2), from an iron framework structure, painted in black and white horizontal bands, on Sandy island.]

After line 40 *insert*:—

A rock awash exists on the eastern side of the entrance to the strait, about 3½ miles south-westward of Batu Kapal. Two small islets lie close south-westward of this rock; the northern islet, which is the lower of the two, in line bearing 203° with a gap in the southern islet, forms a good alignment for clearing the rock.

[Line 42: *After* " **Dangers.**—" *insert* " **Buoys.**—"]

[Line 46: *After* " visible " *insert* " ; a spherical buoy, painted in red and white horizontal bands and surmounted by a red ball, marks the south-western extremity of the reef surrounding the south-western islet "]

Line 47: *After* " patch " *insert* " , with a drying rock close northward of it,"

Lines 48-49: *Delete* " [a] 2½ " to " discoloration," and *substitute* [" the 4¼-fathom (7^{m}8) patch is marked on its southern side by a red can buoy; a] 3½-fathom (6^{m}4) patch which cannot always be distinguished by discoloration, but which is marked on its northern side by a [conical buoy, painted in black and white chequers,"]

After line 51 *insert*:—

[A light is exhibited, at an elevation of 190 feet (57^{m}9), from an iron framework structure, 33 feet (10^{m}1) in height, painted in black and

Page 603 continued.

white horizontal bands, situated on Tanjong Labuan Compenie (Point "A") about 2¾ miles north-north-eastward of Sandy island light-structure.

A conical buoy, painted in black and white chequers, is moored on the eastern side of a 7-fathom ($12^{m}8$) patch situated about 2¾ cables north-eastward of Tanjong Labuan Compenie; a 9-fathom ($16^{m}5$) patch lies about one cable further eastward; a similar buoy, marking a depth of 6¼ fathoms ($11^{m}4$) at the northern extremity of the shore bank, is moored about 5½ cables east-north-eastward of Tanjong Labuan Compenie.]

A shoal, with a least depth of 3¾ fathoms ($6^{m}9$) over it, [marked at its northern end by a conical buoy painted in black and white chequers,] lies about 2 cables off the south-eastern shore of the strait and 1½ miles eastward of Kampung Bitung; about 7 cables east-north-eastward and 3¾ cables westward of this shoal are 5-fathom ($9^{m}1$) patches, each about 2 cables offshore [; the latter shoal is marked by a conical buoy painted in black and white chequers.]

Page 604.—Lines 6-10: *Delete* "A pier" to "pier-head." and *substitute*:—

[An obstruction situated about half a mile north-westward of Tanjong Labuan Compenie is marked by a red can buoy.]

Bitung village ————————————————————
is situated on the Celebes shore about 4 miles east-north-eastward of Girian village; Aer Tembaga, a Government fishing station, lies on the same shore one mile further north-eastward.

[A wharf, with a planned length of 1,312 feet ($399^{m}9$), was under construction, in 1953, at Bitung; in April, 1955, it was reported that a length of about 770 feet ($234^{m}7$), with a depth of 34 feet ($10^{m}4$) alongside, was available for berthing vessels.]

A pier projects for about half a cable from the shore, midway between Bitung and Aer Tembaga; a reef which dries lies close south-eastward of the pier-head.

Lines 20-21: *Delete* "anchorage" to "village" and *substitute* "good anchorage in Reede Bitung off the Celebes shore, about 4 cables south-eastward of Aer Tembaga"

After lines 47 *insert*:—

Chart 930 plan of Straat Bangka.

Lines 48, 52: *Delete* "(Banka)"
Line 50: *Delete*: "(North cape)"
Line 52: *Delete* "(Ganga)"

Page 605.—Line 1: *Delete* and *substitute*:—

Chart 930, plan of Straat Bangka.

Line 18: *Delete* "(Jiko)" and "(Batu)"
Line 19: *For* "266 feet ($81^{m}1$)" *read* "263 feet ($80^{m}2$)"
Line 24: *For* "Batu" *read* "Batoe"
Line 31: *Delete* "(Arus)"
Line 36: *For* "352 feet ($107^{m}3$)" *read* "351 feet ($107^{m}0$)"
Line 38: *After* "Tindila" *insert* ", an island 168 feet ($50^{m}8$) high,"
Line 44: *For* "295 feet ($80^{m}9$)" *read* "331 feet ($100^{m}9$)"

Page 606.—Line 1: *For "940" read "930, plan of Straat Bangka."*
Line 25: *For "Likupang road" read "Reede Likoepang."*

Page 606 continued.

Lines 26, 32: *Delete* " (Likupang) "

Lines 37-43: *Delete* and *substitute*:—

" of Likoepang, has a least depth of 2¾ fathoms ($5^{\mathrm{m}}0$) over it and is usually marked by tide-rips; it lies on a bank, with depths of 5 fathoms ($9^{\mathrm{m}}1$) and less over it, which extends about 4 cables north-north-westward and 5½ cables southward of its shoalest part; a 3-fathom ($5^{\mathrm{m}}5$) shoal lies about 3 cables south-south-eastward. A shoal, with a depth of 5¼ fathoms ($9^{\mathrm{m}}6$) over it, lies about 1¾ miles north-eastward of the shoalest part of Korrier rif, and another shoal, with a depth of 6¾ fathoms ($12^{\mathrm{m}}3$) over it, lies about 9 cables northward of the same place.

A shoal, with a least depth of 4 fathoms ($7^{\mathrm{m}}3$) over it, lies nearly 1¾ miles north-north-westward of Korrier rif, and depths of from 5 to 6 fathoms ($9^{\mathrm{m}}1$ to $11^{\mathrm{m}}0$) exist up to about one mile south-westward of this shoal. A 3¾-fathom ($6^{\mathrm{m}}9$) shoal lies about 1¾ miles north-north-eastward of Likoepang village, and a 2¾-fathom ($5^{\mathrm{m}}0$) shoal lies 6 cables further north-westward.

The above are the outermost dangers in Straat Bangka."

Line 50-51: *Delete* " and a " to " westward." and *substitute* " and the 3¾-fathom ($6^{\mathrm{m}}9$) patch lying about 1½ miles west-south-westward."

Line 52: *For* " *Talisei road* " *read* " *Reede Talisei* "

Line 54: *Delete* " (Kinabahutan) "

Page 607.—Line 1: *For* " *Talisei road.*" *read* " *Reede Talisei.*"

After line 3 *insert*:—

A shoal, with a depth of 5¼ fathoms ($9^{\mathrm{m}}6$) over it, lies about 4½ cables south-eastward of the southern extremity of Kinabahoetan.

Line 12: *For* " 3 cables " *read* " one cable "

Line 16: *For* " can " *read* " mooring "

After line 17 *insert*:—

A black mooring buoy lies on the northern side of a 4½-fathom ($8^{\mathrm{m}}2$) shoal situated about 2 cables eastward of the mole head.

After line 23 *insert*:—

Chart 940 and 930, plan of Straat Bangka.

Line 28: *For* " 29-feet ($8^{\mathrm{m}}8$) " *read* " 4½-fathom ($8^{\mathrm{m}}7$) "

Lines 29-30: *Delete* " 30 " to " westward " and *substitute* " 5¼ fathoms ($9^{\mathrm{m}}6$) and 5½ fathoms ($10^{\mathrm{m}}1$) over them, situated about 2¼ miles west-south-westward and 4 miles westward, respectively,"

[**Page 609.**—Line 44: *Delete* " A " to " ball " and *substitute*:—

" A beacon painted in black and white horizontal bands surmounted by a similarly coloured ball under a black cone "]

[Lines 48-49: *Delete* " , surmounted " to " bands,"]

[Line 54: *For* " foul ground " *read* " areas of foul ground "]

Page 610.—[Lines 2-3: *Delete* and *substitute*:—

" the positions of which may best be seen on the chart."]

Line 12: *After* " roadstead " *insert* " and two about 7 cables south-south-westward of the light-structure "

Page 611.—Line 51: *After* " **Mongondou.**—" *insert* " **Beacon.**—"

Page 612.—*About* line 14: *below* sketch: *For* " 1934." *read* " 1934.) "

Line 16: *For* " The bank " *read* " A white beacon, with a ball

Page 612 continued.

topmark, stands close within the 3-fathom ($5^{m}5$) line off Bolaang Mongondou; the bank "

Line 17: *For* " village " *read* " beacon "

Page 613.—Line 50: *After* " **Anchorages.**—" *insert* " **Light.**—"

Page 614.—*After* line 18 *insert*:—

A light is exhibited from a structure situated about 1½ cables north-westward of Damar.

Line 52: *For* " 17 feet ($5^{m}2$) " *read* " 20 feet ($6^{m}1$) "

Page 616.—Line 31: *Delete* " , surmounted " to " balls,"

Page 617.—Line 47: *Delete* and *substitute*:—

"A light is exhibited, at an elevation of 14 feet ($4^{m}3$), from a wooden mast "

Page 620.—Appendix I: Surabaya: *Delete* all details and *substitute*:—

Graving dock .	Col. (3) 9	92
	Col. (5) :	21
	Col. (10) :	6
	Col. (11) :	6
Floating dock .	Col. (3) :	543
	Col. (5) :	80.7
	Col. (10) :	24
	Col. (11) :	25½
	Col. (12) :	15,500

Page 623.—*Delete* the information concerning Cocos islands.

Page 626.—*Below* " Anchu, Tanjong " *insert*:—

Andalas 3,67

NEW AND ALTERED NAMES

The following list gives new names and alterations in old names which will be adopted in all Hydrographic publications affected as opportunity occurs:—

New name	Page of Pilot	Obsolete name
[Ajer besar	77	Hoorn eilandje]
[Ajer kechil	77	Haarlem eilandje]
[Alang Alang, Tanjong; Sunda strait	45	Tweede punt]
Alipang peak	434	—
Andalas	3, 67, etc.	—
[Balimbing Pamantjasa	52	Vlakke hoek]
[Barak, Gosong	64	Boompjes rif]
[Batu kechil	52	Betoea]
Baucau radio	352	—
Berambang	159	—
Bitung, Reede	604	Bitoeng, Reede
Bitung village	604	—
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